THE OPERATOR AND
ELECTRICAL WORLD
A Journal For Telegraphists Telephonists and Electrical Engineers
Electricians

VOL. XIV.—No. 3. NEW YORK, JANUARY 20, 1883. PUBLISHED WEEKLY. $3 A YEAR; 5 CENTS PER COPY.

TO WHEATSTONE.

RESPECTFULLY DEDICATED TO MR. W. C. HUMSTONE.

[The introduction of the Wheatstone system of automatic telegraphy in the New York and Chicago offices of the Western Union Company, where operators are being trained in its use by English experts, has led an enthusiastic operator in the latter city to rise into poetry, as follows]:

Spirit of progress, soul of speed, O king
Of soaring science, Wheatstone! hasten, spring,
Throughout this great Republic, with that speed
Long proved and praised in England. Great indeed
Thy works of wonder, wizard Wheatstone, are.
Reveal thy miracles, performed afar.
Come like a glorious shaft of knowledge shot
From heaven's centre. Hasten! Linger not!

Between Chicago and New York (each land
A frontispiece to Freedom's book), doth stand
Wheatstone, one hand extended over each,
Uniting, blessing them, resolved to preach
Through them to all America his speed,
Of which so swift a nation stands in need.
The more a mortal being knows, the more
He needs; and Wheatstone has a magic store.

I must admit that Morse is honest, though
His voice is failing and his steps are slow.
His voice is hoarse; he suffers from a cold;
The whirlwind woke by Wheatstone, strong and bold,
When sweeping past him, chilled him and he sneezed,
Coughed, and ignoring grammar, groaned, "I'm freezed!"
And from the future came a voice, "Wheatstone!
Onward!" and from the past, "Poor Morse! Och hone!"

Morse is like idols men have worshiped long,
Till they have proved them the reverse of strong
Enough to struggle against progress. Morse,
Now trembling, stutters, sad, in accents hoarse:
"America, wait! wait! Wherefore so fast?
Long have I been thy friend, and now am cast
Aside for one of greater fame than I.
The child grows strong; the father old must die."

Thus pleads poor Morse, while Wheatstone, with a whirr
That should within the veriest sluggard stir
To life a longing for the joy of speed,
Runs. Morse is like a withered reed.
That he is swift, I grant you; but, alack!
His speed depends on swiftly flying back;
While Wheatstone, like this country, young yet strong,
Flies forward with a merry, stirring song.

England has tested Wheatstone; by him swears,
And for our Morse she very little cares;
All her best work she gives to Wheatstone's hands,
While Morse oft in the corner idle stands.
Life is progression; things of yesterday,
To-day we throw, as useless things, away.
Morse in his time was good, but now Wheatstone
Will rule for long on an unshaken throne.

America, thou who never look'st behind,
But ever forward, hoping there to find
Still something better, turn thy searching eyes
On Wheatstone, England's long successful prize,
And make it always thine; and well I know
Wheatstone, when tested, ne'er again will go
Unhonored from thee, enterprising land,
Who ever giv'st a stranger generous hand.

This stranger, not like one who comes with fears,
Comes crowned with rich results of many years,
And conscious of his strength, convinced true worth
Will blossom in this fruitful part of earth
As well as 'neath the glances of the queen,
Or in old Ireland, paradise of green.
Bravo! the great Wheat *stone* has been well thrown
Across the seas by Hercules Humstone.

Electric Lighting—XII.

Other inventors have sought to improve upon "polar" armatures, as armatures of the Lontin description are called. A few years ago M. Alfred Niaudet described a machine which he constructed in 1872 (Fig. 50). A number of cores wound with wire were fixed to a disc by screws, so as to be parallel with the shaft. This armature revolved between the poles of two U permanent magnets, as shown in the figure. Of the two upper poles, one was *N* and the other *S*, the corresponding lower poles being consequently *S* and *N* respectively. If the two upper poles had been both *N*, and the lower both *S*, then the induction in each half of every core would have neutralized the other half, and no current could have been obtained, while in this manner the inductive effect of each U magnet is added to that of the other. The coils were connected all around in a continuous series, and at each junction was a connection to the commutator, as in the Gramme armature. The commutator was made of strips fastened radially to the outer face of the disc, holding the cores together, and the collectors pressed on these at opposite points, the commutation taking place, normally, as each coil prepared to leave one set of poles, as in the Lontin machine. This machine, though it was at least as good, theoretically, as the Lontin, never was developed industrially, probably because M. Niaudet conceded its inferiority to the Gramme machine.

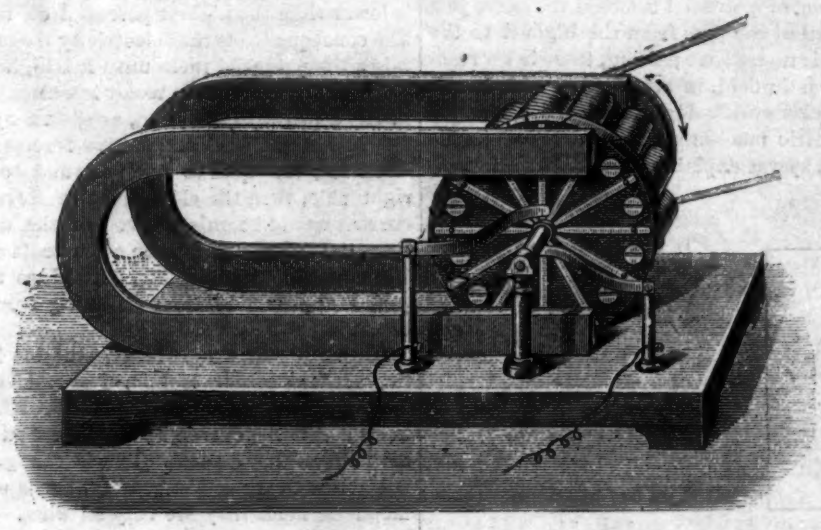

FIG. 50.

WALLACE-FARMER.

Perhaps the most important machine of this class was that designed by Mr. Moses G. Farmer and improved by Mr. Wallace, and known as the Wallace-Farmer machine (Fig. 51). This machine greatly resembles Niaudet's machine in principle; in fact, we might consider the armature to be essentially a double Niaudet armature. There are two iron discs in the centre, with iron cores of elongated section projecting outwards on either side. These cores are wound with wire and are connected to each other and to the commutator, just as in the Gramme machine, each side having its own commutator, and the point of reversal being the same as in the Niaudet machine. The magnetic field was produced by a U magnet on each side, the core having a somewhat oval section instead of being round as in the Gramme field. The polarity of each pole on one side was opposite to that of the other side, as in the Niaudet machine. The currents from each side could be used in combination or independently, as in the double Gramme machines. This machine is open to the same serious objections that we ascribed to the Lontin machine, and which equally pertain to the Niaudet machine; if anything, they apply still more strongly to this machine, because the action of the field is restricted to very few coils compared to the number in the armature. Hence, the proportion of passive resistance or dead weight to the active coils is increased. Not only this, but the consequences of Lenz's law, which were referred to in connection with Lontin's machine as due to the passage of the current through the passive coils, are even more striking. Then, the local induction in the iron of the cores is enormous, and, of course, this consumes power, for these induced currents also react according to Lenz's law; they are not only useless to the machine, but they are harmful, for their energy expends itself as heat. These cores become extremely hot in a short time after starting the machine. Their heat becomes transmitted readily to the wire of the coils, and, as we noticed in speaking of resistance, the effect of heating any wire is to increase its resistance. In this case, the internal resistance is thereby increased, and the same electromotive force of induction will no longer give rise to the same current. High opinions were expressed of this machine, which made its appearance in this country some five years ago. But its active life was very short. It proved so far inferior in "duty," *i. e.*, the amount of current generated for the power used, that it was almost immediately laid aside and discarded.

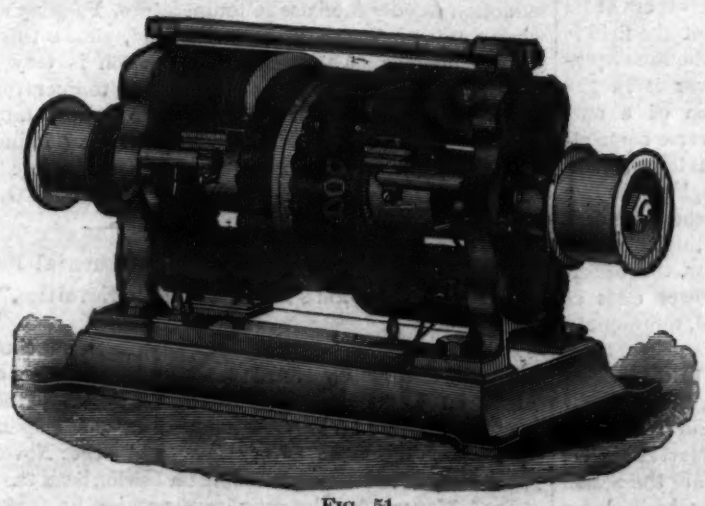

FIG. 51.

FIG. 52.

The machines which have been described so far form the types from which the various generators at present in use for electric lighting have been derived. Before passing

on to these interesting modifications, with many of which we are all more or less familiar, it is necessary to revert to the modes and methods of using the currents generated by these machines for the production of light, that is to say, the various forms of lamps. But a few more details must be added to the present portion of the subject before we pass on to that one. The local induction in the cores of armatures has such a direct bearing on the efficiency or economy of generators, that it must be considered an intrinsic part of the theory of their actions. There is also another point on which we wish to enlarge here, as important in the same relation; it is the fact that the point of reversal changes with the speed of the machine and other conditions. We deem it all the more important to treat these two points fully here, inasmuch as other writers have failed to make them as clearly understood as their importance would demand.

MASS INDUCTION.

We have seen that the induction of electrical currents in wires composing a circuit depends on certain conditions, without which it cannot take place. The circumstances and conditions attending the induction of currents in circuits composed of wires are well known to us, but now we are to consider these phenomena under a slightly different phase, or the induction in masses of metal, to which we have previously alluded under the name of local induction. Hitherto we have found it important to keep each portion of the circuit distinct and separate from the other by insulating material. The most important condition, moreover, was that the circuit should be completed or closed by bringing the distal ends in contact, so that the high potential at one of these ends could have a path for the transfer of some electricity to the other end of the circuit, where the potential is lowest, in the effort to produce equalization. When the circuit is open the motion of the wires across magnetic fields produces a difference of potential between the ends, just the same; but no current can pass from the highest to the lowest; and as there is no current passing, there is no reaction against the magnetic field, in accornance with Lenz's law, and consequently no work is done; that is why the armatures of dynamo-electric machines turn so easily while the circuit remains open, as was explained under Lenz's law. It

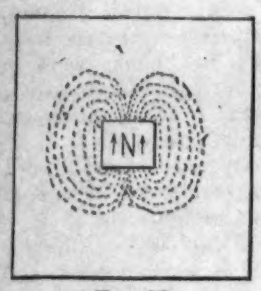

FIG. 53.

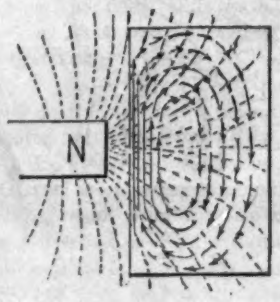

FIG. 54.

seems difficult to understand how these conditions can be realized so that we may get induction in a mass of metal where apparently no provision exists for making a circuit. But the philosophy of this induction is really very simple, and will be readily understood with the assistance of the illustrations. Fig. 52 shows a magnetic field produced by two poles *N S* at a short distance from each other. A number of wires fixed in a frame are moved in this field so as to cut the lines of force from right to left. The three wires *a b c* are cutting across the field, the other wires to the left having cleared the field, and the wire *d*, with the others at its right, not having yet entered it. The action of the field is such that it tends to raise the potential in the lower portions of each of these three wires and to lower it in the upper portions, so as to tend to the production of a current in the upward direction. If the transverse connecting pieces are of wood or other insulating material, then, evidently, no current would pass from the high to the low potential; but if these pieces are metal, then the potentials can equalize themselves by urging the current through those wires which are passive on either side. Now, the difference of potential between the upper and lower ends of *a b c*, due to the action of the magnetic field, represents a certain electromotive force, and this electromotive force causes the current to flow upward and then to diverge on either side, following the transverse portion, and to divide and pass down the passive wires and again reach the lower ends of *a b c* by following the lower transverse piece. Our circuit is therefore complete. But what are the actual conditions? Simply these: A conducting body, large enough so that only parts of it were acted upon by the magnetic field, and the parts not acted upon afforded a path for the equalization of potentials, or, in other words, for the passage of the currents induced in the active portions. Let us now turn to Fig. 53. Here we have a sheet of metal passing across the same magnetic field (shown by the square and letter *N*). The difference of potential here also gives rise to an electromotive force, tending to pass a current in the active portion from below upward, as shown by the arrows. The rest of the sheet, not being under inductive influence, can act as a way for the current to complete its circuit in, and so the current distributes itself over the whole surface, circling around as shown by the dotted lines. Thus we have a true circuit in the mass of the sheet itself and the length of each line represents the resistance which that portion of the current has to overcome. A ready analogy presents itself to assist us in understanding this action. Suppose our diagram were a square vessel containing water; now if we take a paddle and place it at the lower edge of *N*, and move it in the direction of the arrows as far as its upper edge and remove it, we produce a movement in the water that makes it form two whirlpools, one on each side, the motion of the water corresponding exactly in direction with the general course of the current in the diagram. The conditions are, indeed, truly analogous; in one case we have a difference of potential or electromotive force, in the other a difference of pressure or a "hydromotive force," so to speak.

Let us study the action still further. Instead of a sheet of metal we will use a block of metal, as shown in Fig. 54, which is a side view of the block, moving away from the observer, across the magnetic field of *N*, represented by the dotted lines. This magnetic field, as we see, penetrates the whole mass, and so there results an electromotive force of induction tending to send the current upward in *every* part of it. But we must bear in mind that the field is much denser at the left hand side, near the pole, than it is at the right hand side, and that consequently the electromotive force of induction on that side is much greater. Now, if the electromotive force on the two sides were equal, as it would be if another pole *S* were on the right hand side, then no current would move, because the potentials above being equal to each other at every point, no diffusion of charge could take place so as to transmit the current from above downward. But in the present instance the potential at the upper left hand side, although lowest of any point over the same vertical line, being highest below, is yet higher than the potential at the upper right hand side, for the reason that the number of lines of force cut is smaller on the right side, and the highest potential below is lower than the highest potential on the left hand side. The consequence is that electricity passes to the right, and raises the potential there until it is higher than the highest potential below, and the result is a circulation of electricity in the downward direction, as shown by the arrows. If, for instance, the electromotive force of induction on the left side were equal to two volts and to one volt on the right side, then the electromotive force of the resulting current would be only one volt or the difference between the two. The distribution of currents on the face of this block would be as in Fig. 52, and, as seen on the top, it would appear like lines radiating from the face of the block.

Thus it is that we get local induction in any metal cutting across a magnetic field. The results which this induction implies are valid consequences of Lenz's law, because in each case the currents induced are such as to oppose the motion producing them. In weak magnetic fields we do not notice the effects so readily, perhaps, but with strong magnetic fields they are very striking. It is a familiar experiment in physics to suspend a small cube of copper to a string and twist the string so as to cause the cube to rotate between the poles of a very powerful electro-magnet. The instant the magnet is magnetized the cube stops. Indeed, it stops so quickly that not a tremor of the string can be perceived. With a very intense magnetic field the movement of a sheet of copper across the lines of force, as in Fig. 53, meets with a certain resistance, as if cutting butter. Both these effects are consequences of Lenz's law. The currents thus induced in masses of metal have no work to do. The very nature of their origin precludes the possibility of utilizing them. They accordingly expend their energy in producing heat, and the metals subjected to induction rapidly increase in temperature. Faraday's disc, when rotated in a strong magnetic field, shows this in a striking manner. The resistance to motion is very great and the heat of the disc rises soon to the temperature of boiling water. Foucault was the first to inquire into the origin and causation of these currents of local induction, and for this reason they have been frequently termed Foucault currents.

C. O. M.

Prof. Alfred M. Mayer on "The Experimental Demonstration of Ohm's Law, and other Novelties."

The lecture room at the Stevens Institute of Technology was well filled Friday eve., Jan. 12, by the members of the New York Electrical Society, who had gathered there to hear Prof. Alfred M. Mayer's lecture on "The Experimental Demonstration of Ohm's Law, and other Novelties." The society is to be congratulated on having been the guest of Prof. Mayer; for the experiments which he performed before them are possessed of the highest interest, and this, with his genial way of treating the subject, made the lecture a rare treat to the listeners. The society has seldom listened to a lecturer so much at ease with himself and with his subject, and who could so thoroughly interest the audience in his theme. There was none of that formal, studied style of delivery, with which many lecturers seek to give artificial weight to facts. His style was purely informal and unconstrained. His aim was to let the subject speak for itself as much as possible, and therein lay the secret of his power to so deeply interest an audience in experiments the nature of which was already familiar to most of his hearers. His pleasant manner seemed to invest the domain of physical research with a new attraction. One could but remark in him that regard for precision and accuracy, that studious attention to little details, which characterize the true physicist. Prof. Mayer is not only a savant; he is also eminently a good teacher. He is not content to confine himself to present methods of teaching, but his originality sallies forth in search of better ones, and the lecture was a case in point. Some years ago he showed experimentally, by means of floating magnets, the synthesis of molecules in chemical combinations, in a most interesting and suggestive way. To-day he shows an analysis of Ohm's law which is the very *experimentum crucis* that science has been waiting for.

It is now about forty years since the labors of Dr. G. S. Ohm, a German physicist, culminated in the celebrated law bearing his name, and which explains or summarizes the relations between the three factors in electrical distri-

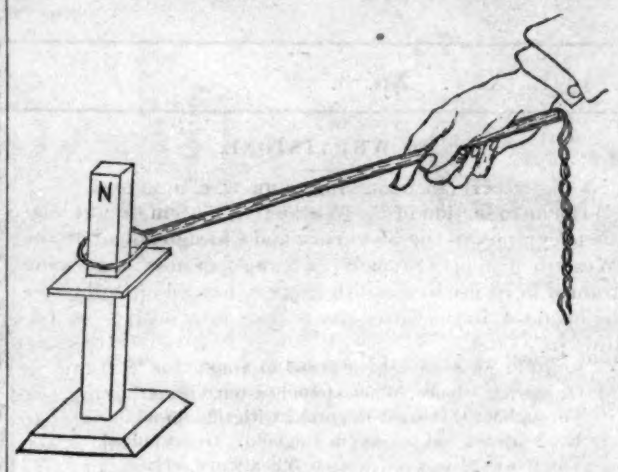

FIG. 1.

bution—electro motive force, resistance, and current. The statement of this law $\left(\frac{E}{R} = C\right)$, and the consequences which it involves, are so well known as to require no definition. But though we have been using this most important law as our guide in all cases, when it came to the matter of physical proof or demonstration, about all we could say was that we could not *disprove* it, and refer to the mathematicians to help us out. But Prof. Mayer has filled this gap in the most admirable manner, for his experiments, so extremely delicate, bring out results with mathematical accuracy, and withal, his apparatus is of the most uncomplicated character.

It is well known that when a wire cuts across the lines of force of a magnetic field, the electromotive force of induction depends on the number of lines of force cut in a given time. Prof. Mayer adopts a magnetic field as the most convenient method of producing an electromotive force that can be regulated at will. Fig. 1 shows a permanent bar magnet fastened to a block of wood, so as to stand vertically with one pole *N* free of access. A piece of wood with a central opening is slipped on this pole, so as to fit rather tightly, and moved down to a convenient point, nearly at the neutral point of the bar magnet. Prof. Mayer then makes use of a series of circuits so arranged as to subject various lengths of wire to the magnetic field. Fig. 2 shows how this is done. He takes a wire and bends it in a circle or loop *A* (Fig. 2), and then ties the two ends of the wire, coming from this loop, to a strip of wood. These ends were connected to the conductors leading to a Thomson reflecting galvanometer, which is so delicate that by just moving one of the conductors leading to it the lines of force of the earth's magnetic field, being cut across, give rise to an induced current that can deflect the spot of light several degrees. For this reason both of the conductors are twisted together, so that they may always cut the earth's lines of force alike, and so that the currents induced in both may

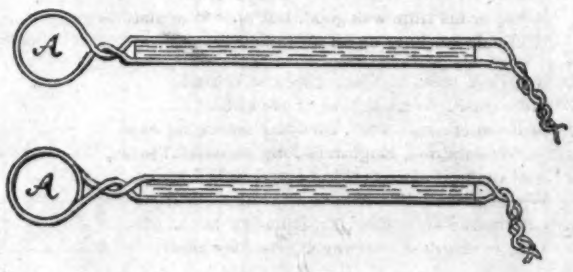

FIG. 2.

neutralize each other perfectly, and not affect the results. It is also for this reason that the two ends of the loop are fixed side by side to the strip of wood. By holding one of the ends of the wire in the hand the slight rise of temperature produced was sufficient to generate a thermo-electric current when the circuit was complete, which would move the spot of light one or two degrees. Prof. Mayer defined the sensitiveness of this galvanometer by stating that when connected to a thermo-electric battery, each degree of the scale represented a difference of one hundredth of a degree of temperature. The galvanometer was truly and accurately tangential, and consequently the spot of light, when reflected on a straight scale, moved to a distance increasing directly with the current; thus, if a given cur-

rent produced a deflection of ten degrees, then twice this current would produce a deflection of twenty degrees. Prof. Mayer connected his loops to the galvanometer, the resistance of the total circuit being precisely one ohm. Then taking the loop by its wooden handle he passed it over the pole *N*, in the manner shown in Fig. 1, until it rested against the wooden piece. It is plain that in so doing it cut the lines of force radiating from the magnet on all sides, and caused a deflection. When the spot of light had returned to zero the wire loop was quietly withdrawn, so as to cut the lines of force again, and the distance to which the spot moved was found to be slightly over four degrees. Having moved the piece of wood upward so as to "take off a few lines," as Prof. Mayer humorously remarked, the deflection was found to be exactly four degrees, the experiment being repeated to show the constancy of this result. Now, according to Ohm's law, twice the

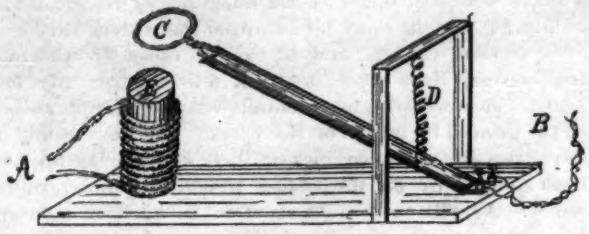

FIG. 3.

electromotive force employed ought to give rise to a current twice as great, if the resistance remains the same, or $\frac{2E}{R.} = 2C$ Prof. Mayer next took a wire loop having two turns (the lower one in Fig. 2), and placed it in circuit with the galvanometer, as before. Now, it is evident that by the same motion the lines of force would be cut by each turn of the loop, and as the electromotive force would thus be doubled, the current ought to be doubled if the resistance remained constant. On trying the experiment with this loop the deflection obtained was exactly eight degrees. Prof. Mayer then tried successively a loop of three, a loop of four and a loop of five turns, the resistance of the circuit being maintained at one ohm in each case. The loop of three turns produced a deflection of twelve degrees or three times the deflection of the one turn loop. The loop of four turns produced a deflection of sixteen degrees and the loop of five turns a deflection of twenty degrees, thus proving Ohm's law to be precisely accurate so far as the variations of electromotive force were concerned. Prof. Mayer then proposed to prove that the law held equally good in regard to variations of resistance. Taking the loop of five turns, which gave a deflection of twenty degrees when the resistance was one ohm, he added an additional resistance of one ohm to the circuit, thus making its total resistance two ohms. According to Ohm's law, then, $\frac{E}{2R}=10$, or, in other words, if the resistance is doubled, then the same electromotive force ought to give a current half as great, or only ten degrees. On trying the experiment this was found to be exactly the case. Prof. Mayer then added another ohm, making the total resistance three ohms. The deflection was then only one-third or $6\frac{66}{100}$ degrees. With four ohms the current was one-fourth of twenty degrees, or five degrees. With five ohms in circuit the deflection was four degrees or one-fifth of twenty. In each case the results were exactly in accordance with the theory, thus proving conclusively that the variations of the resistance in a circuit reacted on the current just according to the law of Ohm in all cases.

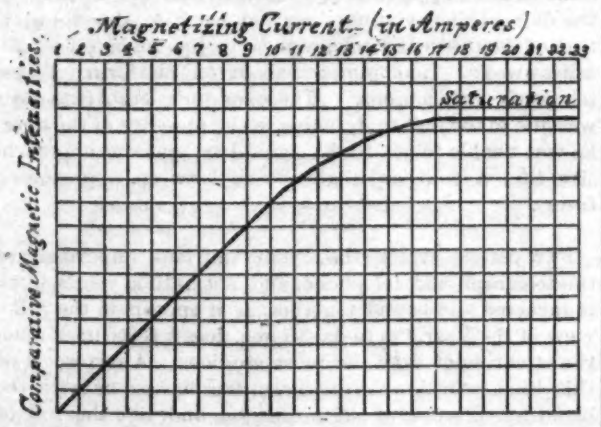
Magnetizing Current. (in Amperes)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Comparative Magnetic Intensities.
Saturation

FIG. 4.

Prof. Mayer mentioned, with some detail, the application of these experiments to the calibration of galvanometers, a most evident and interesting application. Suppose we had a galvanometer whose scale was not graduated and it was desired to mark off the points of equal increase. Then, with a magnetic field and with a circuit of constant resistance including a loop which is made to cut this field of force, one turn in the loop would give a certain deflection, two turns would give a deflection representing twice as much current, three turns three times, and so on; or with the same loop, twice the current resistance would lower the current to one-half, three times to one-third, four to one-fourth, etc.

The most interesting and novel application of this apparatus was to the study of the effect on the magnetization of iron of increasing the current. The apparatus was modified slightly (Fig. 3). The loop *C* was hinged to a board and held up by means of an elastic spring *D*. This loop was connected to the galvanometer by the conductors *B*, as before. A piece of iron *E* was made the core of a helix of wire, connected at *A* to a suitable source of current. Prof. Mayer had several such helices, one having a single course or layer of wire, another two courses, another three, another four, etc., so that the magnetic power of a given current could be multiplied on the core to the required extent. The resistance was so adjusted as to remain constantly uniform, no matter which coil was in circuit with the battery. Now, on passing through the current, *E* became magnetic to a certain degree. The loop *C* was then brought down until it encircled the core, and then, after the galvanometer had quieted, the loop was allowed to spring upward, cutting the lines of force as before. Now, it is evident that the greater the power of the magnetic field, the greater ought to be the current induced in the loop, But there are several factors to be eliminated: 1st, the action of the helix itself; 2d, the residual magnetism of the core; 3d, the effect of the earth's lines of force. These three factors are to be distinguished from the fourth, or the magnetism induced in the core, which is the value to be ascertained. So by trying the experiment with the helix alone (the current passing through it, of course), its effect on the loop can be ascertained; then the core is tried by itself, and the effect of the residual magnetism ascertained; then the loop is tried alone, so as to ascertain the action of the earth's lines of force. Then the three results are subtracted from the total obtained with both core and helix, and thus the induced magnetism can be estimated in degrees of deflection. A helix with two courses is evidently equal to passing the same current twice through one course, and so its effect is equal to doubling the current. The experiments with currents of different strength show that the magnetism induced in the core increases in direct proportion with the current acting on it, up to a certain limit, which is the point of "saturation." Fig. 4 shows this result by a curve. The horizontal lines show equal points of rise in magnetic intensity, while the vertical lines show equal increments of current. We can see plainly that when the current is four ampères the magnetic intensity of the core is four times as great as with one ampère. As the current increases the effect increases, but as the core approaches saturation the increase of current no longer increases the magnetic intensity proportionally, and the rate of rise is slower and slower, as shown by the curvature of the line of rise, until finally the further increase of current does not add to the magnetic effect, which remains constant. Prof. Mayer's observations, so far, have been made only on cores of the purest and softest iron; but in concluding he expressed his intention to extend his researches to various grades of iron and steel, in order to detect, if possible, the effects, if any, due to the presence of carbon in various proportions, and of the physical conditions, such as temper, etc.

The audience followed the lecturer with eager interest throughout the lecture, and repeatedly applauded the success of his experiments. At the conclusion, President Jones came forward and suggested a vote of thanks, which was given unanimously. Prof. Mayer expressed his pleasure at meeting the society, and intimated his willingness to appear before it again at a future date. After an opportunity to inspect the apparatus used by Prof. Mayer, and a visit to the physical laboratory of the Institute, to see the extensive collection of apparatus, especially the famous large magnet, the society returned to New York.

Some Advantages of Electricity.

In his recent address to the Royal Society, Mr. W. Spottiswoode, D.C.L., LL.D., made the following observations on electricity: "While offering to the public this new commodity, electricians may, in one respect, especially congratulate themselves, namely, that their article is incapable of adulteration. An electric current of a given strength and a given electromotive force is perfectly defined, and is identically the same, whether it comes from a Siemens or a Gramme, from a magneto or from a dynamo machine, or, as suggested by an eminent counsel before the Select Committee of the House of Commons, from one machine painted red, or from another painted blue. It has been said, and perhaps with truth, that the electric light will be the light of the rich rather than that of the poor; but in more ways than one electricity may now become the poor man's friend. The advantages in avoidance of heat and of vitiated atmosphere in workshops and factories have often been pointed out, and may ultimately become an important factor in the physical growth and prosperity of our population. But, besides this, when electricity is literally brought to our doors, it will become possible, by converting it into motive power of limited extent, to revive some of the small industries which, during the last half century, have been crushed by the great manufacturing establishments of the country. There are operations which are capable of being carried out by the wives and families of workmen; there are works of small extent which can be performed more advantageously in a small establishment than in a large one, and it can hardly fail to be a gain to the community if this new departure should give fresh opportunities for the development of our industry in these directions."

Canadian Notes.

A handsome, new glass-front partition counter has been placed in front of the receiving clerks' desks in the Great Northwestern telegraph office, Montreal.

In 1849, in a single room on what is now Front street, Toronto, with a single operator on a high stool, laboriously spelling out from an old-time ponderous Morse register the messages that came in from Buffalo and Montreal on a single wire, the telegraph business of Toronto began. That industrious operator was Mr. A. P. Dwight, now the quiet, able and energetic manager of the Great Northwestern Telegraph Company. As an operator, Mr. Dwight was noted for his correct and legible copy. He is held in much esteem by the employés of the company, being ever ready to hear any of them, and considerate of the interests of all.

The capital of the new Montreal telephone company, to which we recently referred, is reported to be all taken up, a number of influential gentlemen being subscribers, among them Senator Ogilvie, Hon. John Hamilton and Mr. Wm. Cassils, president of the Canadian District Telegraph Company. As the Bell Telephone Company owns the sole right to use the Bell telephone in Canada, the new company is obliged to use the instruments of other inventors, which it claims will yield better service. Mr. L. N. Benjamin has been in New York for the company, securing the rights of various inventions. It is expected that the instruments will be furnished to the city subscribers during February, and the system will be immediately extended through the neighboring municipalities.

Mr. L. A. Senecal, while in Toronto recently, said that the new Atlantic cable company, which we mentioned in last issue, intended reducing the present rate of fifty cents a word to the old rate of twenty-five cents. There will be no fear of the Great Northwestern Company ever getting control of the new cable, as it will be given to a syndicate to manage. This syndicate, although not being able to control the stock, will be given the contract of running the cable for ten years, and will be composed of business men having an interest in maintaining the cable and securing a rate for their own benefit. There will be a double cable laid, and the company will enjoy all the advantages that other lines have. There was no difficulty in having the stock subscribed for twice over, and it will be held by capitalists in Paris, London, New York, Montreal, Toronto, etc. The new company will be perfectly separate from the Great Northwestern Company, but it may work in connection with the Mutual Union or some other company. It will have perfectly independent lines to Montreal, Quebec, Halifax, New York and other points.

The eight cables now laid between America and Europe have an aggregate share capital of $64,000,000. The contemplated new cable will cost $2,200,000. The average cost of the older cables was about $2,500,000, and they are thus compelled to carry $44,000,000 of watered stock, and cannot pay dividends on a 25 cent tariff. Five of the eight cables are old, and may require replacement at any time.

The annual meeting of the Montreal Telegraph Company was held on Thursday, Jan. 11, at Montreal, Mr. Andrew Allan, president, in the chair. Among those present were Messrs. H. Mackenzie, John Crawford, J. Dakers, E. K. Greene, J. Cassils, J. P. Cleghorn, E. Burke, Alex. Buntin and R. Mitchell. When the annual report, of which we have already given a summary, was presented, the chairman asked if it would be taken as read. This brought to his feet Mr. Dakers, former secretary of the company, who had been removed by the late president, Sir Hugh Allan. Mr. Dakers desired to know how the difference between the present bank balance and the one in the report was accounted for. The chairman replied that the report only went as far as the 30th of December. Mr. Dakers then proceeded to criticise the report, intimating that the sum of $6,250 charged to "maintenance" had not been properly accounted for, that the balance of credit statement, $16,878.90, was too small, and finding fault with the directors for holding on to the telephone stock, which Mr. Crawford explained was not sold because it was paying six per cent.

Mr. Dakers declared that he had been dismissed by the late president, Sir Hugh Allan, without a character. A lively passage at arms then ensued between Messrs. Daker and Allan, and the latter asked if the shareholders were not tired of the discussion. Several gentlemen having answered in the affirmative, the report was submitted as read, and passed.

The meeting then proceeded to the election of the Board of Directors for the ensuing year, with the following result Mr. Andrew Allan, Mr. John Crawford and Mr. Hector McKenzie, re-elected, and Messrs. E. K. Greene and Wm. Cassils, in place of the late Dr. G. W. Campbell and the late Sir Hugh Allan. The meeting then adjourned, and a meeting of the directors was called for the purpose of electing a president and the transaction of other business. Mr. Andrew Allan was re-elected president.

Mr. William Cassils, one of the new directors, is an old and practical telegraphist, who has risen from the ranks to his present honored position.

The defalcation discovered in the accounts of the former treasurer of the Montreal Telegraph Company, shortly before the lease of the company's lines to the Great Northwestern Company, is supposed to have led to the removal of the venerable ex-secretary.

THE OPERATOR
AND
ELECTRICAL WORLD,
PUBLISHED WEEKLY AT
No. 9 MURRAY STREET, NEW YORK.

W. J. JOHNSTON, Editor and Publisher.

NEW YORK, JANUARY 20, 1883.

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NEW ADVERTISEMENTS.

In the growth of our paper in circulation, size and general improvement, the value of its columns for reaching those engaged in electrical pursuits or interested in electrical matters has not failed to be appreciated by advertisers. In order to better enable our readers to notice anything new which advertisers may have to offer them, we shall henceforth give in this column a list of new advertisements as they appear in each number. The following will be found in to-day's issue:

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GOING BACK TO FIRST PRINCIPLES.

With the perfection of the quadruplex and duplex systems of telegraphy, telegraphic methods seemed for the time to have settled down into a steady routine. Recently, however, there have been evidences of a renewal of activity in another direction, which cannot be ignored. Singularly enough, the new essays are in a certain sense a return to a principle long since abandoned in American telegraphy—that is, the use of tape for recording the Morse characters.

We recently described the system of the American Rapid Telegraph Company, apparently a healthy and growing corporation. In addition to this system, three others in which the same recording principle is employed are being worked out by different companies, each of which has classes of Morse operators under instruction. The first of these is the Western Union Company, which in New York and Chicago has for some time had a corps of Morse operators in training in the use of the Wheatstone system, a system so long before the world, and so well known to every student of telegraphic text-books, as to require no description here. The second is the Mutual Union Telegraph Company, the Western Union Company's most vigorous rival, which is initiating a number of its operators in the use of Mr. Walter P. Phillips' system of "steno-telegraphy," in which the messages are transmitted by the ordinary Morse key, but in which words are represented by a system of contractions or abbreviations, somewhat resembling those colloquially familiar to all telegraphists, but still more resembling those combinations of letters used by stenographers to represent in type their word-signs, and called by them "stenotypy." As it would be impossible for any operator to transcribe and expand these abbreviations from the Morse sounder, they are received on an ink-writing Morse register.

The third of the new methods about to be put into practice is the Leggo system, the patent of which has been acquired by the new Postal Telegraph Company, whose line between New York and Chicago will probably be opened for business this month. In a room at No. 2 Dutch street, in this city, this company also has a class under tuition in the mysteries of tape-reading. In the Leggo system the messages are transmitted on a local circuit by an ordinary Morse key and are received on a metallic cylinder, the spaces only being recorded, in an insulating ink. The cylinder, when its surface is covered with messages, is placed under a metallic stylus connected to the main line and rapidly revolved, the stylus following the ink lines, breaking circuit wherever it touches the ink which represents the spaces, and completing the circuit where it touches the uninked portions of the cylinder, representing dots and dashes. The characters are reproduced at the other end of the line on a chemically prepared tape. This system has been sucessfully operated between New York and Boston.

Thus, in the offices of three companies the singular spectacle is seen of old sound operators returning to the rudiments of Morse telegraphy, and learning to read the dots and dashes from the flowing tape.

A curious fact brought to light by these experiments is that many sound operators, rated as first-class, do not know what their own writing looks like on paper, and some of them have been unable to recognize their own names when transcribed on the tape in Morse characters. In the early days of sound-reading it was held that the proper way to learn telegraphy was to begin with a Morse register, but that notion has long since been abandoned, and there are many skillful sound operators now in the profession who have almost never seen a Morse register. No little amusement has been caused in some of the classes referred to by good sound operators mistaking – ——— for "G" and – – – for "C," in their first attempt to read from the tape.

The idea of automatic telegraphy is almost as old as the idea of telegraphy itself—in fact, Morse's first conception of his system of telegraphy fifty years ago embodied a device for automatic transmission, based on an impression that the human fingers would not be able to accurately measure off the dots, dashes and spaces in their proper proportions, an impression that he very soon grew out of, although the wild struggles of some of our operators with the Morse characters, for "6," "P," etc., show it to have been not entirely unfounded. From that day to this the problem of automatic telegraphy has occupied the attention of telegraphic inventors. *A priori*, it would seem to be a correct method, yet it has made but little advancement. Numerous unforeseen difficulties have stood in its way, and glowing prospectuses issued by inventors of automatic systems from time to time have come to naught. The simultaneous attack upon the problem by several of our telegraph companies at the present time, however, gives a new significance to the subject.

To the practical telegraphist the interest in the question is chiefly that of its bearing upon telegraphic labor. The question that he asks is: Will the success of automatic telegraphy throw Morse operators out of employment? We do not think there need be any ground for uneasiness on this score. The invention of the sewing machine did not, as was predicted it would, ruin the business of the seamstresses, but rather helped them. Anything that cheapens telegraphy will increase it, and even automatic systems must have Morse operators. In fact, the system adopted by the Postal Telegraph Company requires them exclusively, and the same may be said of the system with which the Mutual Union Company is experimenting, which, although in its present form not strictly automatic, can readily be made so, the inventor having devised a transmitter through which is rapidly passed an embossed tape, prepared by Morse operators on local circuits. These two systems will therefore be apt to find more favor with Morse operators than those in which perforating instruments with key-boards are employed. Their extended use would, indeed, doubtless cause a greater demand for skilled Morse operators.

THE year 1883 promises to be a poor year for telegraph consolidations, amalgamations and pools. Not the least interesting of the developments in this respect are those which we give in another column, as a result of an inquiry instituted by the United States Government into the Atlantic cable pool. The documents, which the Secretary of State has secured in a way that seems somewhat humiliating to the people of a great country, and which have just been laid before Congress, seem to make out a clear case of bad faith toward the Government by the French cable company, which has been aggravated by the refusal of the cable companies to furnish the Government with the information it requested, equivalent to an assertion that the doings of the cable companies were none of the Government's business. The interesting question now is: What is the Government going to do about it? The cables are laid; they cannot be taken up, as the city of Philadelphia proposes to do with the American Union Telegraph Company's lines, nor can the Government confiscate them, as the State of Pennsylvania proposes to do with the Western Union Company's lines in that State, for a similar offense; and any attempt to impose a penalty is liable to involve international complications. Mr. Cox, who called for the information, and who now has evidence that the French cable company has deliberately ignored the stipulation of the United States Government, should hasten to let the country know what he is going to do about it.

THE telegraph has demonstrated its value to humanity in more than one way during the three weeks of the present year that have passed away. As an instance of its protection to society, may be mentioned the case of the defaulting treasurer of one of the Southern States, the news of whose flight, scattered broadcast by the telegraph, enabled him to be caught and returned before he reached the Mexican border. The part that it plays in ameliorating the suffering of mankind has been illustrated by the appeals flashed over the wires for aid for the homeless victims of the floods in Europe and for the sufferers by the terrible disaster in Milwaukee, and by the prompt and generous responses, also by wire. A graceful American writer has said: "The telegraph brings the only common food, and works this daily miracle, that every mind in Christendom is excited by one topic simultaneously with every other mind; it enables a concurrent mental action, a burst of sympathy, or a universal prayer to be made, which must be, if we have any faith in the immaterial left, one of the chief forces in modern life. It is fit that an agent so subtle as electricity should be the minister of it."

MUCH capital has been made by the advocates of the compulsory placing of electrical wires under ground out of the report that the efforts of the firemen to place ladders for the rescue of the victims of the hotel fire in Milwaukee were obstructed by the telegraph wires near the building; and it must be admitted that if true this is a very serious charge, and is hardly offset by the fact that several lives were saved at a fire in this city last year by persons swinging themselves from an upper story to the ground by means of the wires; but how would it have been if the fire engines on their way to the fire had been stopped by an unfinished trench for underground wires? As will be seen by an item in another column, however, the manager of the Western Union office in Milwaukee says the report is not true, and that, on the contrary, the wires were the means of saving several lives.

THE frailty of human resolutions is illustrated by the report that comes from Richmond that "Bogy," whose intention to permanently locate in Florida we confided to our readers some months ago, was seen in that city a week or two ago on his way Northward. Such is the power of the ruling passion. No place has charms enough to hold him long, not even the

—Bright and sunny Southland, where the sweet magnolia grows,
And blends its rarest fragrance with the odor of the rose;
Where the warbling of the mocking-bird goes out upon the breeze,
And floats in pleasing cadences through semi-tropic trees.

A POPULAR American juvenile magazine makes some capital out of the fact that a French edition of it is published in Paris. THE OPERATOR AND ELECTRICAL WORLD has not got quite that far yet, but is in a fair way to do so, for we notice that the interesting weekly *Bulletin* of the Compagnie Internationale des Téléphones has each week a larger selection from our columns, the last issue received—that for Jan. 2—being fully one-half made up of extracts from this paper. We are glad to see this evidence of appreciation of our efforts to make a first-class electrical journal.

WE notice that our valued English contemporary the *Telegraphic Journal and Electrical Review* celebrates its tenth birthday. Started ten years ago, as a semi-monthly journal devoted to telegraphy, its growth has kept pace with that of electrical science, and its weekly visits are now almost indispensable to the wide-awake electrician. Our learned and lively English contemporary the *Electrician* also celebrates its birthday (the fifth) with the beginning of the new year. With electrical science so ably represented in journalism, no English electrician can have just excuse for not keeping in the van.

THE life of a railroad telegraph operator in India has some occasional picturesque features that are lacking in the dull routine of railroad station work in this country. One of them recently telegraphed to the main office, 200 miles away: "Tiger jumping about on platform. Please telegraph instructions." The operator's embarrassment was due to the fact that, owing to the presence of the tiger, he was unable to get to the signal-box, and was apprehensive that a collision might occur between approaching trains.

FEW persons realize the extent and true importance of the telegraph and telephone, and not until a year's work is garnered and bound together, as it appears in the "Review of the Year," in to-day's issue, does it force itself upon the attention of even the most studious. A retrospect of this kind refreshes the memory, familiarizes us with the breadth and scope of our profession, and, like the roll of the drum to a soldier, nerves us to greater achievements in the coming year.

WE are pleased to note in the daily papers that Mr. Gould promptly contributed $500 for the relief of the sufferers by the Milwaukee fire. It is to be hoped that the pleasure he derives from this generous act will stimulate him to make other noble uses of his vast wealth and power. The same papers report that the Western Union Telegraph Company contributed a check for $100 for the same purpose.

IN the twelfth of our series of articles on electric lighting, given in to-day's issue, will be found an interesting exposition of a phenomenon that has not hitherto received the amount of attention from writers on the subject that is merited by its economic importance, namely, local or "Foucault" currents—a serious obstacle to the efficiency of dynamo-electric machines.

Review of the Telegraphic World During 1882.

The telegraphic year 1882, which opened very quietly, has been remarkable for the great activity shown by rivals to the Western Union during the past few months. The first of January found the opposition very weak; the president of the Mutual Union Company had just died, and with him had died much of the energy displayed in the management of that concern; his Mutual Union stock had come upon the market, and had, it was believed, got into the hands of Mr. Jay Gould, while the absence of the usual aggressive spirit necessary to a live opposition made the field of American telegraphic competition very dull and uninteresting. But, as the year wore on, the Western Union received a thorough shaking up; the Baltimore & Ohio came rapidly to the fore, and, with the rehabilitation of the Mutual Union Company, and with renewed activity on the part of the American Rapid, the close of the year finds the American telegraphs in about as healthy and prosperous a condition as could be wished for the interest of the general public and the welfare of the various companies and their great body of workers. There has been, during the year, a remarkable absence of complaint from the public, the entire telegraphic system being conducted in a more thorough manner than ever before.

THE GOOD TIME COMING.

All this care and efficiency speak well for the future; since the future of the telegraph—and, indeed, of electrical working in all its branches—is something marvelous to contemplate. As was pointed out by Mr. Pender, during his recent visit to this country, the total length of the wires of the world, including submarine cables, is 1,510,592 miles. The trade of the world, said Mr. Pender, is at present represented by $13,935,000,000, and all that large amount of commerce is more or less moved by telegraph. Looking at the facts that the population of the world has doubled itself during the present century—that is, in the past 80 years; the immense extent of land and sea which has yet to become productive; that the growth of commerce is much faster than the growth of population; and that the competition is so keen that no man now has a chance of success unless he use the telegraph and telephone extensively, there is much room for congratulation for all who are engaged in the field of electrical labor.

THE WESTERN UNION.

The management of the Western Union seems to have settled down to hard work, and little or no change has been recorded in the ranks of its working officers during the past year. Some dissatisfaction was caused early in the year by the substitution of female clerks for males in some of the larger cities, but the ladies have acquitted themselves very creditably in their new position, and the entire service is working well.

The custom of leasing wires to brokers and others has not been indulged in as much as formerly, and it is believed that the company is inclined to discourage that practice.

The long and remarkably successful career of the Western Union has not been dimmed during the past year, as will be found by a reference to the annual report of President Green, printed on page 433 of THE OPERATOR.

Its stock opened in January at 79 and closed in December at 81.

The company has scarcely been as successful in the courts of law. It has had a full year of the terrors of "the law's delay," the suits following upon each other with bewildering perplexity, until, as a way out of the web, a number of its own stockholders are proposing to bring an action against their own corporation (the Western Union). This suit, which would of course be of a friendly nature, would raise and unite all the separate law points, which have already been raised in the multiplicity of suits now pending. The company can thus get speedily a final adjudication of all disputed points.

THE OPPOSITION LINES.

Whatever may have been the success of the Western Union Company during the past year, the opposition lines have not been behind the great monopolizer in bidding for and deserving public patronage.

The Mutual Union, which was without a president, and comparatively spiritless during the first three months of the year, gave signs of renewed activity by the election, in April, of Mr. John G. Moore as president. At that time there were evident signs of wavering on the part of the Mutual Union as an opposition company, and public confidence was again shaken when, in July, Mr. Jay Gould turned over to the Western Union 40,000 shares of Mutual Union stock. But these fears have not, so far, been justified, and, under the management of Mr. Moore, the close of the year finds the Mutual Union faithful to its public trust and second to none in competing for the public confidence. It now covers nearly all the paying points covered by the Western Union, and employs some of the most talented managers and operators in the business.

The Baltimore & Ohio Telegraph Company has meanwhile, during the past year, loomed up quietly, without much advertising, and may now be classed as quite a formidable opposition line. It opened its lines last month direct from Baltimore to New York, and bids fair to give the public a great, prosperous and thoroughly independent system of telegraph, both by sea and land.

The American Rapid Company has extended its lines considerably during the past year, and as is well known, they are of the best material. Under its able management, it has come prominently to the fore in competing with the others for public patronage.

The Southern Telegraph Company is building lines and opening offices throughout the Southern States, and is meeting with much success.

Another company—the Postal—has been engaged for some time in constructing lines in the West. These when completed promise to be of an excellent quality. The company, however, is not yet ready to open for business.

In Canada, the Canadian Mutual Union, whose lines connect with those of the Mutual Union, has made good progress during the year. The same may also be said of its big rival, the Great Northwestern Company, which controls all the telegraph business in Canada not handled by the Canadian Mutual.

One of the most remarkable features of the great prosperity in telegraphy is that the vast increase in the use of the telephone has not hurt the telegraph business in the least, but that both go on prospering, speeding as they go, in all directions, and side by side.

THE TELEPHONE.

The fourth convention of the National Telephone Association of the United States met at the Hotel Vendome, Boston, on the 5th of September—two days being devoted to business, and two days to very pleasant recreation. The proceedings, which are fully reported in the September issues of THE OPERATOR, were highly interesting, practically and thoretically.

It is hard to realize that but six years have elapsed since the introduction of the telephone, but its marvelous growth forces the hard facts upon us. According to the latest, trustworthy statistics, carefully prepared by the *Compagnie Internationale des Téléphones*, the telephone at the beginning of October had more than 100,000 subscribers in America. New York headed the list of all cities in the world, Chicago being second and Paris third. A calculation of the ratio of the number of the subscribers showed that in a large number of small towns in America there was a telephone for every twenty inhabitants; in Chicago and in Zurich, the proportion was about one per 200; in New York one per 500; in Brussels one per 800; in Paris about one per 1,000; in Berlin one per 2,000; in London one per 3,000; and in St. Petersburg one per 4,000.

We have not yet received the report of the American Bell Telephone Company for the present year; but, owing to the rapidly growing interest and the great public necessity, it will doubtless show a vast increase over the previous year. The report of the company, for the last fiscal year (ended February 28, 1882), showed an increase in the number of instruments rented to subordinate companies from 132,692 to 189,374 (over 4,700 a month); exchanges in operation, 408 to 592; subscribers, 47,880 to 70,525; miles of wire, 28,316 to 49,168. The gross earnings for the year were $1,001,924, of which $885,312 came from the rental of instruments, and the net earnings were $562,061. This showing will, we believe, be greatly increased in the next report.

The telephone has been extended all over the world—notably in India, China, Mexico and the West Indies. England has been slow to properly utilize this wonderful and most useful invention, but she is being aroused to its necessities, and the telephone there is spreading slowly but surely.

The much agitated question of long distance telephoning has not advanced much during the past year, and it seems to have been temporarily abandoned.

THE ELECTRIC LIGHT.

Although the electric light has not been materially improved upon since the close of 1881, its use has been universally extended, and it has been very profitable to the companies controlling it. It has become rather too much of a speculation in England, where so-called electric light companies sprung up like mushrooms, but the recoil has come upon themselves, and its management is being concentrated in the hands of responsible and competent men. Its steady improvement in this country has been duly recorded in detail in THE OPERATOR'S department devoted exclusively to that subject.

IMPROVEMENTS IN ELECTRICAL SCIENCE.

The year 1882 has been more of a "working" and practical year than a theoretical and inventive one. Very few new theories worthy of note have been advanced, and the year has rather been devoted to the extension and perfection in practical working of old ideas.

Perhaps the most important discovery is that of the Faure Accumulator, which was brought here in May, from Havre, France, and has since been largely introduced. It has scarcely done all that was promised for it, but it has done very well, and gives great promise for the future.

THE CABLES.

The network of ocean cables is rapidly closing in and around the world, and the statement is made, on the authority of Mr. Pender, that nine-tenths of the commerce of the whole universe is now connected by submarine telegraphs. The submarine cables now show a total length of 71,000 miles, representing a capital o fabout $150,000,000, and yielding a yearly revenue in the aggregate of over $15,000,000.

The most important extensions have been on the west coast of America, from Valparaiso northward via Panama; and, in April, from Emden, Germany, to Valentia, Ireand, thus giving Germany direct communication with America—a circuit which had previously been worked from Emden to Lowestoft, England, whence the business was relayed to Valentia.

Two new Atlantic cables, in connection with the Baltimore & Ohio system and the "opposition" lines generally, have been projected, under the auspices of Messrs. John W. Garrett and James Gordon Bennett, and will very likely be completed during the present year. Another anti-Gould cable line, from Nova Scotia to Ireland, is also promised. The promotors of the scheme are well-known Canadians, and its success is said to be assured.

EXCELLENCE OF THE SERVICE.

The wonderful perfection to which the wires have been brought may be best illustrated by the fact that messages are now sent direct over such very long circuits. For instance, in September last a Western Union wire was worked direct from Boston, Mass., to Chihuahua, Mexico, a distance of 3,037 miles, and this feat was subsequently excelled by a connection from San Francisco, Cal., to Tor Bay, Nova Scotia, a distance of 4,125 miles, including about 600 miles of ocean cable. But the phenomenal success of the telegraph has not all been due to the high state of perfection to which the wires have been brought. The operators have shown all of their skill and willingness in contributing to this great end. In April last 7,349 words of press were sent by Morse on the New England Press wire between the hours of 12 M. and 3 P. M.—nearly 2,500 words in each consecutive hour—and Mr. P. J. Tierney, in this city, has sent and received an average of 39½ messages per hour for 18 consecutive hours. This excellence can be retained, and even improved upon, by a continuation of the present liberal and intelligent system of management.

OBITUARY.

Death has been lenient during the year with the busy workers in the service of electricity, though some of the losses have been keenly felt. In Europe, Dr. Fife Jamieson, a well-known electrician, died at The Manse, old Aberdeen, Scotland, on the 18th of April; Carl Louis Schwendler, an electrician of world-wide fame, who commenced life as a bricklayer's laborer, died at Schoeneberg, near Berlin, on the 6th of January; and M. Leclanché, inventor of the well-known battery that bears his name, died at Paris in September. At home, we lost, September 9th, Gen. Edwards S. Sanford, at one time the president of the American Telegraph Company; James W. Simonton—a grand character in American journalism and telegraphy, who died at Napa, Cal., November 2d; and, on October 20th, Mr. H. C. Maynard, manager of the Western Union Company at Chicago.

CONVENTIONS AND SOCIETIES.

There have been two national conventions of operators during the past year—one at Cincinnati, Ohio, March 16th, 17th, and 18th, and the other at Pittsburgh, Penna., March 20th, and 21st. Besides these conventions, 478 operators attended a meeting at Pittsburgh, March 5th, to discuss the interests of the profession. The encouraging result are well known to every operator who takes an interest in the general welfare, and need not be recounted here.

The second reunion of the Old Time Telegraphers' Association, held at Niagara Falls, N. Y., Sept. 9th, was a very entertaining affair.

The Military Telegraphers' Association also met there on the same day. These meetings brought together quite a number of veterans, and the two organizations enjoyed a joint banquet at the International Hotel.

The New York Electrical Society made good progress during the year, and is at present in a prosperous condition.

The Telegraphers' Mutual Benefit Association is in a highly prosperous condition, holding a reserve fund of about $25,000. It reports 19 deaths last year, or one to 112 of membership.

THE ILL WINDS.

The elements, with the exception of fire, have given very little trouble in telegraphic communication during the past year. On the night of Sunday, April 16, a brilliant auroral display, which manifested itself in England on the 17th, and in Australia and other parts of the antipodes from the 15th to the 21st, put a stop to telegraphic communication. Again, on November 17th, a furious magnetic storm—the most remarkable known in the history of American telegraphy, prevailed all over this continent. No other general interruption has taken place, but the telegraph has been singularly unlucky with regard to fire. Among the most notable occurrences of this kind were: The Western Union switch-board and cupola at Baltimore, burned September 3d, causing much delay to business and damage to the amount of several thousand dollars, and the burning of the Western Union switch-board at Cincinnati, October 22, which again caused much annoyance. On September 20, the telegraph office at Lisbon, N. J., was struck by lightning, and completely destroyed by the ensuing fire. The Western Union office at Salem, Mass., was consumed by fire, April 6, and all the instruments, records and back business were burned; and, in May, the Western Union office at Tombstone, Arizona, was destroyed by fire. On the 10th of April there was also a fire, slight

however, at the Electrical Exhibition at the Crystal Palace, London.

The only serious disagreement between the operators and their employers occurred in the beginning of August, at Denver, Colorado, and it resulted in a strike, which, however, was not supported by the main body of operators, and speedily died out. The strike was local in its nature, and bore no relation whatever to the operators at large, as an organization.

The messenger boys "went out" four times during the past year. At Boston, March 17, on account of an ill-advised attempt on the part of some cranky Western Union official to reduce their earnings from 2½ to 1¼ cents per message; at Boston, March 24, when the American Rapid boys struck; and again at Boston, July 22, when the Western Union boys once more struck, on account of not receiving their pay promptly. In all of these strikes the boys were successful as soon as the news was telegraphed abroad, and reached the executive officers in this city; and it is to be hoped the over-zealous and parsimonious local officials were promptly rebuked. In the fourth attempt of this kind, November 2, the Western Union messengers at No. 8 Broad street, this city, were unsuccessful.

ELECTRICAL JOURNALISM.

While our inventors have been comparatively inactive, the practical workers have been busy, and have taxed the resources of telegraphic and electrical journals to their utmost. The students and practical workers in this great science have, however, not been disappointed, for their representative journals have kept well up to the fore.

On the 1st of January the *Telegraphic Journal and Electrical Review*, of London, was considerably enlarged, and its issues changed to weekly; and, as a consequence, it has since became more interesting than ever. *La Lumière Electrique*, of Paris, found it necessary to go even further, and changed from a weekly to a semi-weekly.

In this country, THE OPERATOR'S enlarged form and increased frequency of issue did not deter enthusiastic capitalists from establishing no less than three new electrical or telegraphic papers, signs which speak well for the general confidence felt in the stability of this field of enterprise.

On January 1 the initial number of *The Electrician*, a monthly journal, was issued in this city. It has proved a very worthy and painstaking journal, reproducing some of the best written articles from foreign journals, and in neatness and discrimination fully justifying its existence.

Two months later there appeared in this city *The Review of the Telegraph and Telephone*, under the management of Mr. George Worthington. It has proved itself well worthy of its comprehensive title and is, seemingly, meeting with the success which it has so well merited.

The Sounder, a small monthly, which appeared at first at Kalama, and afterward at Portland, Oregon, during the fall, under the management of Mr. Homer H. Hallock, is a bright specimen of Western enterprise, but it is too far removed from telegraphic and telephonic centres to reach the success which its vigor and ability merit.

THE OPERATOR, as its patrons are aware, has not been asleep during the past year. Issuing twice a month 24 and sometimes 36 pages to meet the tremendous pressure, and increasing its issues, October 14th, from semi-monthly to weekly, it has during the year made a heavy volume of 744 pages of solid matter. It has published, with many instructive and interesting essays, 112 illustrations, of which ten were portraits, including those of Messrs. Jay Gould, John Pender, James D. Reid, Dr. Norvin Green and a number of prominent electricians and operators. As a climax to all this, its further enlargement and improvement, on the first of January, have placed it fully in advance of everything as an exponent of the interests of telegraph, telephone and electric light companies, and the workers therefor; and THE OPERATOR AND ELECTRICAL WORLD has now *by several thousands* the largest circulation among regular paying subscribers of any electrical journal in the world.

A single exception to the general rule has been the organ of the Western Union Telegraph Company, the *Journal of the Telegraph*, which, on the first of March, fell back from a semi-monthly to a monthly, and is now issued apparently for free distribution, in the interest of the Western Union.

THE TELEGRAPH ABROAD.

One of the most remarkable changes in the electrical world, has been the great re-awakening in Mexico, with regard to the telegraph, telephone and electric light. These, with the railroads, have spread there in every direction during the past year, and many of our best electricians have departed for that promising field.

New lines have been opened in Palestine, between Nazareth, Tiberiade and Sofié; in Arabia, from Jiddah to Mecca; and all over Egypt; in fact, it has been amusing recently to read of the affright of the bland Mohammedans, who in their last pilgrimage from Cairo to Mecca, had their "Sacred carpet" torn all to pieces by a violent collision with the Christian's prosaic and ubiquitous telegraph wire.

The latest statistics of European lines, published at Berlin, set Russia first in length of lines, with 50,000 miles; Germany next, with 44,000 miles; France, 43,000; Austria-Hungary, 31,000; Great Britain, 27,000; Italy, 16,000; Sweden and Norway, 12,000; Switzerland, 4,000; and Belgium, 3,500. In length of wires, however, this account places Germany first, with 160,000 miles; Russia second, with 135,000 miles; France third, with 135,000 miles; and then Great Britain, with 122,000; Austria-Hungary, with 90,000; Italy, with 54,000, Sweden and Norway, with 28,000; Belgium, with 16,000; and Switzerland, with 10,000. This would indicate that Russia's length of wires is much less in proportion to her length of lines than that of most other countries, and that England has 4½ miles of wire to every mile of line.

In the amount of business done over these lines, England far surpasses all the others, sending more messages in a given time than Austria, Hungary, Russia, Italy, Holland, Sweden and Norway combined, as may be seen from the following estimate of messages sent in a year: England, 80,000,000; France, 20,000,000; Germany, 17,000,000; Austria-Hungary, 9,000,000; Italy, 9,000,000; Russia, 7,000,000; Holland, 3,000,000; and Sweden and Norway 2,000,000.

Canada has kept well up with the march of improvement. The House of Commons, at Ottawa, on the 18th of April, passed a bill legalizing the amalgamation of the Canadian telegraph system under the Great Northwestern Telegraph Company—working in connection with the Western Union.

MISCELLANEOUS.

There have been two electrical exhibitions during the past year, one at Munich, which was formally opened September 17, and the other at the Crystal Palace, London. Both were very successful, the Crystal Palace having as many as 12,000 visitors in one day (February 25th)

Mr. François Emmanuel Jules Raynaud, E. Sc., a French electrician, and a Chevalier of the Legion of Honor, has been rewarded for his industry by being made an officer of that order.

On the 12th of April, Mr. Paul C. Just, of the Metropolitan Telephone Company, in this city, was presented with a gold medal for heroism displayed at the Potter Building fire in this city.

On the 4th of March, the first instance of propulsion of a street car by electricity took place at Laytonstone, England. It is claimed that it could be worked at one half the cost of horse power.

During the year THE OPERATOR has published notices of 53 deaths, 38 births and 48 marriages in the telegraphic and telephonic ranks. Of the deaths 7 were children and 3 the wives of electricians or operators, leaving 43 deaths of actual workers, against 48 marriages. Of the latter, one was "by telegraph." Of the births 18 were males and 20 females.

THE OPERATOR has also, during the past year, done considerable free advertising for the so-called telegraph "colleges." As a consequence one firm—Messrs. Rockford & Bishop—sued the editor of this journal for criminal libel. The case came to trial before Mr. Justice Walsh, in Brooklyn, June 16th, and the Professors' case fell through so quickly that the school was at once closed up. Two other proprietors of "colleges" have paid to local councils of the Brotherhood round sums as compromises, during the year, rather than have their schemes ventilated in a court of justice.

In this way we hope to continue bringing everything into the light of day—both good and bad alike—and if, during the coming year, anything in the electrical world escape public notice, it shall not be the fault of THE OPERATOR AND ELECTRICAL WORLD.

The Government and the Cable Pool.

In July last the House of Representatives adopted a resolution, offered by Mr. Cox, requesting the President to communicate to that body any information in the possession of the State Department in reference to any change or modification of the stipulation which the French Cable Company made with the Government of the United States on the 9th of February, 1880, when that company received permission to land its cables upon the shores of the United States, to the effect that it would never combine with other companies to raise rates; and further, to report the nature of such change and modification, if any, with a view to Congressional action to prevent consolidation for the purpose of raising rates.

The President, on Jan. 12, sent to the House a letter of the Secretary of State and accompanying papers, containing such information on the subject as the Department had been, with difficulty, able to obtain, including copies of three treaties between the French, English and American cable companies, and a treaty between the Anglo-American Telegraph Company (limited); the Direct United States Cable Company (limited); the Compagnie Française du Télégraphe de Paris à New York, the American Telegraph & Cable Company on the one part, and the Western Union Telegraph Company, the Atlantic & Pacific Telegraph Company, the American Union Telegraph Company, and the Franklin Telegraph Company on the other.

The Secretary of State says of these papers: "They contain all the information in possession of the Department of State in reference to any changes or modifications of the stipulations referred to. At the date of the passage of the resolution, this department had no definite information on the subject. Unofficial efforts failing to procure the information desired, and the official demand made in New York being refused, instructions were sent to the Consul General at Paris to investigate the matter. The officers of the cable company in that city declined to accede to the request of this department, and the Consul General has secured the documents hereto annexed through unofficial channels."

The agreement made Sept. 24, 1880, between the English and French cable companies is the one in which it is asserted that the French company violated its agreement with the Government of the United States. It provides that the agreement shall remain in force until May 1, 1927, but may be rescinded by either party on May 1, 1902, provided that three years' notice be given. All receipts are to be considered as common receipts, and are to be divided between the English and French companies in the proportion of 84 per cent. to the former, and 16 per cent. to the latter. It is expressly agreed and declared that there is between them neither amalgamation nor fusion of interest, but simply a working arrangement or agreement, leaving to each company its administration, its direction, its special employés and agents. Provision is made for changing the percentages of the receipts for each company in case the cables of either shall be inoperative for a long period, and for dissolving the compact if such inoperative condition shall continue. To the French company was assigned the task of obtaining the authorization of the Governments of France and the United States to this convention, which it appears, at least in the case of the United States Government, has never been obtained.

The contract of May 12, 1882, admits the Gould cables (the American Telegraph and Cable Company) into the pool, and provides that that company shall have 12½ per cent. of the common receipts, and after it shall have two cables, 22½ per cent.

Both contracts provide for the fixing and maintenance of tariff rates, and prohibit either party from making any arrangement or contract with any other company without the consent of all.

The final contract, between the cable companies and the Western Union, provides that each party shall deliver messages for transmission exclusively to the other. It requires the Western Union Company to open and maintain in New York City a central cable office in which names and respective emblems of the cable companies shall be distinctly indicated, and in which each cable company may have a representation to oversee the reception, delivery and transmission of messages. The work is to be divided among the cables as nearly as possible in the proportion of their shares of interest in the common rights. Neither party is to make any reduction of rates, and if either party acquires any other lines, such lines shall be subject to the stipulations of the contract. In case the Government of the United States or of Canada shall seize the Western Union lines, the maintenance of the rights and obligations conferred by this contract is to be insisted upon, but if it cannot be enforced, the Western Union Company is not to be liable for damages therefor. Should an opposition cable be laid, the Western Union is to set apart two first-class wires, by different routes, but both passing through Boston, from New York to the Direct Cable Company's cable houses at Rye Beach, N. H., for the exclusive use of that company. The Western Union Company is also required to maintain good wires between New York and Cape Cod, Mass., for the French Cable Company. The letter and accompanying papers were referred to the Committee on Foreign Affairs.

A Christmas Tree Lighted by Electricity.

In a corner of one of the parlors of Mr. Edward H. Johnson, at No. 56 West Twelfth street, says a Philadelphia paper, stands probably the handsomest Christmas tree in the United States. Mr. Johnson is an electrician in the service of the Edison Electric Light Company, and his knowledge and resources have enabled him to prepare an incomparable toy for the gratification of the younger members of his family. This Christmas tree is of large size, and stands on a square wooden platform covered with green baize. Suspended on its branches are sixty-three miniature electric lamps of ten-candle power, worked by three currents from the batteries at the Edison office, a motor being also placed beneath the platform, by which the tree is made to revolve automatically and the color of the lamps to change from white to red and from red again to white. The wires connecting the lamps are skillfully strung with glass beads, and thus utilized for purposes of ornament. Festoons of similar miniature lamps depend from the ceiling, which, with the chandeliers properly belonging to the rooms, make in all seventy-five electric lights in the double parlors. The appearance of the rooms and of the Christmas tree is extremely pretty, and has afforded delight to all who have had the good fortune to see them.

THE ELECTRIC LIGHT FOR COLORS.—The complaints made that the electric light interferes with a desirable display of hues and colors, that it is "very trying" in a ball-room and out of place in an art gallery, are met by the statement that a prominent English dyeing house has successfully introduced it into its works. The statement is made (in *Knowledge*) that "the purity of the light enables them to distinguish colors perfectly and to carry on at any hour operations that could otherwise be performed only by daylight."

Progress of the Telephone in Wisconsin.

The Wisconsin Telephone Company is rapidly carrying out its design of placing all the cities and villages of Wisconsin in telephonic communication. Exchanges are already established in Kenosha, Racine, Milwaukee, Sheboygan, Manitowoc, Marinette, Peshtigo, Oconto, Green Bay, Depere, Appleton, Neenah-Menasha, Oshkosh, Fond du Lac, Janesville, Beloit, Madison, Wausau, Merrill, Stevens Point, La Crosse, Waukesha, Eau Claire, Chippewa Falls and Watertown, and within a short time the exchanges in Port Washington, Oconomowoc, Portage, Lake Geneva, Waupun, Berlin, Ripon, Evansville and Monroe will be completed.

A through line from Milwaukee to Chicago, by way of Racine and Kenosha, has been completed and is working well, and a line from Milwaukee to Racine, by way of Oak Creek, is also completed, for way business. Lines are also completed from Milwaukee to Waukesha, and from Waukesha to Mukwonago. The construction of a new line, Milwaukee to Fond du Lac, to include West Bend, Barton, Kewaskum and New Cassel, has been commenced, and lines are already completed from Fond du Lac to Ripon, Berlin, Dartford, on Green Lake, and intermediate places. A system of lines from Fond du Lac to Menominee, Mich., has been completed and is in successful operation. It includes the telephone exchanges in Oshkosh, Neenah-Menasha, Appleton, Kaukauna, Depere, Green Bay, Suamico, Oconto, Peshtigo and Marinette. All these have regularly established telephone exchanges, which are extensively used by subscribers in the transaction of business, and are open to non-subscribers for a small toll.

Work has been commenced on a line from Milwaukee, through Janesville and Beloit, to Rockford, Ill., and on a line from Watertown to Johnson's Creek, through Jefferson and Fort Atkinson, to Milton. Quite a number of little lines have been built in addition to those mentioned, among others three from Green Bay to small towns in the interior, which are not reached by railroads or mail routes, and a large number of small branch lines are in course of construction. These lines, connecting places which on account of lack of railroad and mail facilities would otherwise be shut off from the world, are very extensively patronized. The company hopes to reach Madison during the coming season, not only by completing the connection with Milwaukee, but also by connecting the capital with all the principal cities in the State.

The company has at present about 450 miles of wire throughout the State in operation, and despite the inclemency of the weather nearly two miles of wire are added every day. Superintendent Haskins is confident that during the present year fully 1,000 miles will be added to the mileage of the company in the State. The subscribers in the State outside of Milwaukee now number 2,600, and their number will be doubled during the year. There are nearly 900 subscribers to the Milwaukee exchange, and about 500 miles of wire have been strung in that city.

The demand for new telephone connections taxes the large working force of the company to the utmost, and the present quarters in Milwaukee have long since proved entirely inadequate. The company recently purchased the building opposite its present location, on Broadway, and will have it put in shape for the general offices, central office, repair shops, etc.

The Signal Service.

General W. B. Hazen, Chief Signal Officer, has published a circular in which he takes strong ground against the proposed transfer of the Signal Service from the War Department to the Interior Department. Copies of this circular have been furnished to every member of Congress, accompanied by a personal letter urging active influence against the bill providing for the transfer now pending in the Senate. Another circular, taking an exactly opposite view of the case, has been similarly distributed. This is an anonymous circular, and is signed "United States Weather Observers." It agrees with General Hazen that the Signal Service ought to remain under military order, but contends that the Weather Bureau should not. A charge is made that the observers were pledged to oppose the transfer by coercion, and that the service is losing its best men because of the insufferable arrogance, insolence and selfishness of their superiors. It further states that personal influence socially exerted is all that has kept the Weather Bureau where it is, and charges that a transfer of the bureau would bring to light a number of frauds and irregularities, and that it is this, more than a removal from their places of ease and emolument, that the officers fear. It concludes:

"Gentlemen, you have the motive for an investigation of the bureau in the Howgate frauds. Order such an investigation and hear what we have to say under oath and before a committee which will protect us from our officers' fury. All ways of reaching you in person are closed to us. A system of espionage exists at the office of the Chief Signal Officer, whereby he is made acquainted with our every move. To be known as a visitor to a Congressman, as an intimate of an unfriendly newspaper person, as an opponent of the military features of the bureau, means prompt relief from Washington and a long journey to the Territories. Investigate and satisfy yourselves. Do not be coaxed, threatened, wined or dined into furthering the merely selfish ambitions of General Hazen; but if you must take favorable action upon his bill to perpetuate his own sovereign control, do not think that you are furthering the wishes of the observers."

Sun Spots and Earth Currents.

Professor C. A. Young, of Princeton College, delivered in New York, on Jan. 9, a lecture on "The Sun." He told of its magnitude, its motion, its power of light and heat, its constitution, and devoted a large part of the lecture to a consideration of the phenomena of sun spots. Speaking of the influence of the sun spots on terrestrial phenomena, he said:

"The sun spots follow a period; in some years they are plenty and in other years few. That had been noticed long before, but the regularity of the period was not noticed until 1851, when Schwabe, of Dessau, showed that there was a regular rise and fall. The periodicity is not regular like that of the planets in their orbits. Some of the periods are as long as 16 years, while others are not more than 8 or 9, the average being 11 1-9, according to Wolf, since the observations began.

"The compass needle does not continually point to one side or the other. There is a regular change every day of a small amount, and besides that there are irregular disturbances. The aurora borealis makes the needle fairly wild, so that we cannot do anything with it. Some years are magnetically stormy and others are magnetically quiet. There is some close connection between the phenomenon of the sun spots and the magnetic variations on the earth's surface. There is a large school who believe that the sun spots influence the weather. I do not think the evidence is satisfactory one way or the other. Nobody can tell whether the sun is warmer or colder when numerous spots appear upon its surface. The part which is spotted, of course, is colder, but the other portions may be more stirred up and may give us more heat. The prevailing impression is that the sun gives more heat when the spots are more numerous. That is the impression, but there is no sort of doubt as to magnetic disturbances. If there are any telegraph operators here they will remember the magnetic disturbance last November, when in Chicago the switchboard was set on fire by the current from the aurora. I suppose that was connected with the great sunspot which broke out a few days before. It was an enormous storm which showed itself in America, Europe and Asia, and everywhere the magnetic lines depending upon the earth's magnetism were perfectly crazy with excitement. I say I suppose that it was connected with the sun spot; but what the connection is, I dare not tell—I don't know it. I would tell you if I did."

The Western Union Trouble in Pennsylvania.

Attorney General Palmer, of Pennsylvania, on Jan. 11, rendered a decision in the application of citizens of Philadelphia asking that the State file a bill in equity against the Western Union Telegraph Company for violating the provisions of the Constitution relative to the purchasing or consolidation of competing lines. The decision is against the company, addressed to the attorneys for the same, and is as follows:

"After giving the case the consideration demanded by the magnitude of the public and private interests (and the difficulty of the questions is suggested in the very able arguments of counsel), I am of the opinion that it ought to be submitted to the courts for determination, and in coming to this conclusion I have considered the justice and propriety of final judgment in favor of the Commonwealth. I do not see that a formal exposition of the reasons that have led to this conclusion can serve any useful purpose. I shall immediately cause a bill to be filed in the Supreme Court of Pennsylvania, substantially in the form of that presented to you, and praying that contracts and consolidations entered into by the Western Union Telegraph Company with other companies of the State of Pennsylvania, in violation of the constitutional provisions and the general statutes, may be declared void and the said company be perpetually restrained from operating under them."

The bill was presented to the Supreme Court at Philadelphia on Jan. 13. Chief-Justice Mercer suggested that the suit be instituted in the lower court on account of the great number of appeals pending before the present term of the higher tribunal. While the Supreme Court had original jurisdiction in such matters, it has not been customary for it to burden itself with the disposition of cases filed there originally. Mr. Pettit replied that, while he knew the Supreme Court rarely exercised its original jurisdiction, he thought that the present case was an exception to the general rule. He declared that the State was entitled to be heard in preference to individuals, and as this matter was one extending throughout the State, and which interested the entire people of the State, it should be given the benefit of the opinion of the highest judicial tribunal in disposing of it. As the judges were about taking the case under consideration, Mr. Pettit requested of the court that they give a decision as early as possible in answer to the prayer of the bill, so that no embarrassment might ensue on the retirement of the present Attorney General. Justice Mercer replied that the court would not decide a matter of so much importance immediately, owing to the absence of Justices Paxson and Green, two of its members.

In the bill of complaint the Attorney General, after reviewing the history of Western Union, avers that company "has established a monopoly of telegraphic business in Pennsylvania, and by its repeated violation of the Constitution and defiant disregard of the prohibitory law of the State, has forfeited its right to exercise the franchise of maintaining and operating telegraph lines in the State, or of doing any business whatever therein, and can no longer claim the benefit of the comity existing between the States of Pennsylvania and New York." The relief asked is, in substance, as follows: "That a decree may be made declaring all contracts, leases, and consolidations made between defendant and other telegraph companies in violation of the Constitution and laws of the Commonwealth of Pennsylvania null and void," and that "the Western Union Company be restrained perpetually from maintaining and operating any line or lines of telegraph within the Commonwealth of Pennsylvania which have been acquired and are now operated by them in violation of the Constitution and laws of the Commonwealth."

The Supreme Court on Jan. 15 decided not to entertain original jurisdiction in the matter. The Court of Common Pleas of Dauphin County, the Chief Justice said, had full jurisdiction in the premises, and that was the proper court in which to begin the suit, the court of Dauphin County being clothed by an act of Assembly with special powers of jurisdiction in cases of this kind.

Dr. Green Before a Congressional Committee.

Dr. Norvin Green, president of the Western Union Telegraph Company, appeared before the sub-committee of the House Judiciary Committee on Jan. 13, to discuss the provisions of the bill recently introduced by Mr. Joyce, of Vermont, for the regulation of telegraph and cable companies. He said the Western Union Company had 400,000 miles of wire, 12,600 offices, and cables in London, and that it took nine hours for the sun to rise on its lines, but it had four competitors of greater or less magnitude, all of which might avail themselves of every privilege it had been granted. The Western Union was performing a better telegraphic service than was being done anywhere in the world, and, taking all in all, at a lower rate of tolls. Dr. Green said this in view of the resolution offered in the House for an inquiry as to the best steps to be taken to improve and reduce cost of telegraphic service. There was perhaps in England and some of the countries on the Continent a larger area of the 25-cent rate, but the Western Union had an area of 15 and 10-cent rates which those countries had not, and the 50-cent rate covered a much larger territory than any of the compound rates of England and the Continent. Nowhere in the world could a message be sent a distance equal to that from Boston to Portland, Oregon, for $1.50, the rate of the Western Union. Referring to the measure under consideration, Dr. Green said the first section contemplated what the company was compelled to do and had done—to take messages from other companies and forward without discrimination. The second section assumed to compel the Western Union to take free certain words necessary to perfect the message, which it did for nobody. A rule of the company limited the signature to two words more than the name, and the date to the place where received. In a case where a dispatch was taken from another company at New York, dated Albany, the last date would have to be charged for. Unless that were so other companies would use the Western Union lines in competition with it. That was really attempted in the bill, which also sought to compel the Western Union to take messages on the blanks of other companies unable to send them, which was a fraud. The courts had held that the company must exercise due caution to see that signatures were genuine, and if messages came from unfriendly sources the Western Union could not vouch for their genuineness.

Dr. Green, referring to the power of Congress in the matter, could see no difference between telegraph and railroad lines. The law, he thought, contemplated that the Postmaster General should fix the rates for Government telegraph service. The third section fixed the penalty for refusing to allow opposing companies to use the Western Union lines in competition with it. The fourth was humiliating, as it intimated that the officers of the company had the privilege of inspecting the messages. Dr. Green had never known such a charge to be substantiated, and the States had penal statutes for such an offense.

PRESCRIBING BY TELEGRAPH.—A correspondent of the London *Electrician* relates the following: "An employé of the Eastern Extension Telegraph Company, stationed at Cape Bolimao, Manila, had a narrow escape the other day, having taken 10 grains of sugar of lead in mistake for a similar quantity of ammonia. He telegraphed for advice to the Hong Kong telegraph office. Dr. Hartigan of that city came down to the office, and sent him advice per cable, which resulted in his recovery. The distance between Hong Kong and Cape Bolimao is about 555 miles." Probably this is the first time that a doctor has prescribed for a patient over 500 miles away from him.

Hamilton (Ont.) Happenings.

To the Editor of the Operator and Electrical World:

SIR: It is some years since "the Ambitious City" was heard from through your columns, during which time many changes have taken place. Mr. George Black is still manager of the Great Northwestern telegraph office, and is as popular as ever. He is acquiring a good reputation as an electrician. Mr. A. B. Smith remains with us as chief, kind and affable. He returned, a few weeks ago, from an extensive tour of inspection through the Eastern Provinces. Mr. John Hall acts as assistant chief. Miss Emma Seed has charge of the market wire; Mr. Geo. Allan works the Toronto line; Mr. J. J. Seitz looks after the London and Western wires, and Mr. Thomas Allan copies day press reports. Messrs. George Havens and George Sallaway compose the night staff. The other members of the force are Miss Marion Seed, Messrs. J. Jamieson, J. Lahey, and A. Ferguson, the latter at present taking holidays. Messrs. McCall and G. Collier are the check clerks, Mr. Hayward Alexander, cashier; Miss Neville, book-keeper: Mr. J. McGilivary, receiving; and Mr. G. Towers delivery clerk.

The operating room is large and cheerful. Its front windows overlook the Gore, a pretty public garden situated in the heart of the city. After the consolidation, a year ago, we took up our quarters in the old Dominion office, which first underwent considerable repairing and refitting.

All our men belong to an Electrical Science Association, with Mr. Black as president. A meeting is held every week, to exhaustively discuss electricity in its various branches and details, with a view to enable members to perfect themselves for higher positions. A reading room has been established where all the electrical papers of the day, together with standard works, are to be found. THE OPERATOR AND ELECTRICAL WORLD has a prominent place in the collection.

Edison's Electric House-Lighting Company has commenced a manufactory for the Dominion in Hamilton. Mr. Swinyard, formerly vice president of the Dominion Telegraph Company, is manager of this, the only Canadian branch.

Mr. John Bale, late of Chicago office, is in the city, engaged in the grain business.

The Mutual Union Telegraph Company has established a branch here, but matters appear very quiet there. Their lines do not connect very extensively in Canada.

Wishing THE OPERATOR AND ELECTRICAL WORLD a good New Year.

HAMILTON, Ont., Jan., 1883. DOT.

Telegraphic Notes from a Pennsylvania Oil Town.

To the Editor of The Operator and Electrical World:

SIR: For a number of years the Western Union was the only telegraph company having an office in this place, the work being done for some time hy the manager and one operator.

In June, 1882, the now famous Cherry Grove oil field, only a few miles from Warren, was opened, and with the advent of the army of producers and speculators, better telegraphic facilities became a necessity. An oil exchange was opened, the Western Union and American Rapid Companies establishing offices therein, and at the present time thousands of messages are handled daily. The Western Union Company now employs about fifteen operators and the American Rapid three. The two companies have a small battalion of counter clerks, book-keepers, and messengers. The American Rapid force is under the management of Mr. Frank Osborne; the Western Union under Mr. James K. Simpson. Both gentlemen are popular with their employés and customers.

Speaking of the latter reminds me that one of our oil princes did a very handsome thing, on Christmas, by making each messenger a present of five dollars and each operator twenty dollars, an act which is appreciated by the boys. The name of the generous giver is T. J. Vandergrift, and the Warren branch of the Brotherhood of Telegraphers is known as Vandergrift Assembly.

An article in your issue of Jan. 6, headed "The Telegraphic Labor Problem," is worthy of notice, and will, I hope, be considered by members of our profession everywhere. I observe in the next article following, that Mr. W. Lenz of the P. W. & B. R. R., was requested to resign for refusing to teach a student during office hours. I have no acquaintance with the gentleman, but I am led to the conclusion that he is made of the right kind of stuff, and he should be taken care of.

All your subscribers here are very much pleased with the style of THE OPERATOR AND ELECTRICAL WORLD, and wish you success.

ULSTER.

WARREN, Pa., Jan. 11, 1883.

The Proposed Universal Morse Alphabet Again.

To the Editor of The Operator and Electrical World:

SIR: The following is an extract from the letter of a superintendent in Spanish America that came to hand after sending you my former communication:

"I employed two native (Morse) operators to learn the International alphabet, so as to enter as under clerks in the cable service, and was much surprised to observe their promptness in acquiring it, as well as to notice how fearlessly they tackled either English or French messages, receiving and transmitting them faster than I ever heard them do in their native tongue (Spanish). There cannot be a shadow of doubt that the moment you remove the possibility of error through (Morse) spaced letters coming together, operators, be they careful or not, must experience great relief in their work and thus operate more rapidly."

Can any better evidence than the above be given to illustrate how easily an improved alphabet can be acquired?

NEW YORK, Jan. 12, 1883. NI.

THE ELECTRIC LIGHT.

A BRUSH DIVIDEND.—The Brush Electric Light Company, of New England, advertises an extra dividend of thirty per cent. on its capital stock, payable Jan. 15.

VALUE OF THE ELECTRIC LIGHT IN NEW ORLEANS.—Very few complaints are now made by countrymen against gambling ropers. In fact, roping is a lost art. Royal street is now so well lighted by electric lights that any stranger can find his way to a gambling house without a guide.—*New Orleans Picayune.*

ELECTRIC LIGHTING FOR TUNNELS.—Vice President Clark, of the New York, New Haven & Hartford Railroad Company, on Jan. 16 informed a committee of citizens of Mount Vernon who had called to confer upon increasing the safety of the tunnel in this city, that electric lights could not be employed to light the tunnel because their glare would blind the engineers to danger signals.

THE ARC LIGHT FOR RAILROADS.—The Philadelphia & Reading Railroad Company has placed eight electric lamps on poles twenty feet high on Broad street, Philadelphia, where its tracks cross that street. This is reported to be a great improvement and to lessen the risk of accidents at that point. The company will probably soon place a number of electric lights along its tracks in that neighborhood, in order to facilitate the shifting of freight cars, which is chiefly done at night.

"GLOW" LAMPS.—Dr. Siemens, in a recent lecture, suggested the use of this term, which is a literal translation of the German "Glühlampen," in preference to "incandescence" lamp, and Mr. Preece has accepted the innovation, which he states in a recent lecture to the Society of Arts to be equally correct and more enphonious than "incandescence," while being also more in accordance with the spirit of the age, the present tendency in English being toward brevity of expression. Mr. Munro, however, objects that a glow can be produced in a variety of ways, while incandescence can only be produced by heating a solid body until it emits light. He holds, therefore, that "incandescence" is the more correct term.

ELECTRIC LIGHTING IN THE ANTHRACITE REGION.—An obliging subscriber in Reading, Pa., has compiled for us the following statistics of the number of electric lights in use in that region, but has omitted to say what lights they are: Pottstown, Pa., the Pottstown Iron Co., 98 lamps; Messrs. Coffrod & Saylor, 10; Reading, Pa., the Reading Iron Works, 55; stores, hotels, etc., 10, and 48 more to be installed as soon as the company has its new engine up; Steelton, Pa., the Pennsylvania Steel Works, 56 Brush Lights, but only 16 in use; Lebanon, Pa., Colebrook Furnace, 10; Allentown, Pa., stores, etc., 20; Lancaster, Pa.. stores, hotels, etc., 5; Lancaster also has a cotton mill and a machine shop lighted by electricity; Pottsville, Pa., the Pennsylvania Diamond Drill Co., 5; stores, hotels, etc., 9. We presume these are principally Brush lights. The use of the electric light is rapidly extending in the anthracite region.

OPPOSITION TO THE ELECTRIC LIGHT IN CHINA.—Although of late the Chinese have begun to adopt vigorously ironclads, railroads and telegraphs, they do not take kindly to the electric light. The Governor of Shanghai has objected formally to the introduction of the Brush system into the settlement, in a letter addressed to the senior foreign consul. From what he has learned about the new method of illumination in translations from Western scientific papers, he believes that the accidents caused by electricity justify him in requesting the removal of all electric lamps in the interest of public safety. Too much risk is involved, he says. Hundreds of houses might be destroyed, millions of lives might be lost; even the walls of the city might be blown down if anything went wrong with the dynamo-electric generators. No Chinaman is permitted to use the electric light. There is a faint suspicion that the Governor had not received from the company enough, if any, money to keep him quiet, and this matter of presenting officials in China with something handsome when anything great is to be done or introduced, if neglected, is very serious at times. Of course, we meet with no obstruction of that sort in the enlightened part of the world, and the absurdity of it in China is laughable in the extreme.

TELEPHONE DEPARTMENT.

DIVIDENDS IN NEW ENGLAND.—The total amounts of the dividends of the various telephone companies whose headquarters are at Lowell, Mass., for the quarter ending Dec. 31, were as follows:

National Bell of Maine	$18,288
Boston & Northern	13,500
Suburban	7,000
Bay State	11,200
Union	1,500
Grand total	$51,488

The total number of stockholders is about eleven hundred.

A TELEGRAPH COMPANY CUT OUT.—A Wilmington, Del., dispatch of Jan. 11 says that on complaint of the Western Union Telegraph Company's manager there the telephone exchange has cut the telephone wire running to the Mutual Union Company's office, on the ground that the Mutual Union Company has violated its contract by using the telephone for the receipt of telegraph messages to be transmitted by its lines. It adds that the matter will probably be contested in the courts.

IT WAS SARAH.—Among the telephone stories floating about is the following: An old man would not believe that he could hear his wife talk a distance of five miles by telephone. His better half was in a country store several miles away, where there was a telephone, and the skeptic was also in a place where there was a similar instrument, and on being told how to operate it, he walked boldly up and shouted: "Hello, Sarah!" At that instant lightning struck the telephone wire and knocked the man down, and as he scrambled to his feet he excitedly cried, "That's Sarah, every time!"

DEATH OF AN AMERICAN TELEPHONE MAN IN THE WEST INDIES.—In a former number we mentioned the departure of Messrs. Preston C. Nason and Os. Arbuckle for the West Indies, where they were to engage in establishing the telephone for the West India Telegraph & Telephone Company. We regret to have to add as a sequel to this announcement that Mr. Arbuckle died in San Juan, Porto Rico, on Dec. 5, of yellow fever. Every attention that could be given him was bestowed by his companion, Mr. Nason, who procured the best medical talent of the island, and had the patient conveyed to a private hospital, despite his protest that he had often had similar attacks at home, and would soon be all right. Mr. Arbuckle was formerly in the burglar-alarm business in this country, and leaves a wife and child at Marshall, Ill., who are reported to be in destitute circumstances. We learn that a private subscription is being taken up for their benefit, to which the West India Telegraph & Telephone Company has generously contributed.

DASHES HERE AND THERE.

AMERICA'S FIRST ELECTRICIAN.—Wednesday, Jan. 17, was the 177th anniversary of the birth of Benjamin Franklin.

A PLEASANT OCCASION.—The "calico party" of the Buffalo, N. Y., telegraphists, on Thursday evening, Jan. 11, was a complete success.

THE WESTERN UNION STEAMER.—The Western Union Telegraph Company has sold its steamer, Professor Morse, and it is to be used as a steam collier.

THE HORNELLSVILLE BALL.—The date of the reception of the telegraphists of Hornellsville, N. Y., mentioned in our last issue, has been changed to Jan. 31.

"ORANGES & VARNISH."—This singular combination was made by a Pennsylvania Railroad operator, a few days ago, out of the address of a message intended for Messrs. Ornam & Parnish.

RUMORED FAILURE OF A CABLE SCHEME.—The New York *Sun* publishes a report that the Garrett-Bennett cable scheme has been abandoned. The cause is said to be an unwillingness of Mr. Garrett to invest in the cable, claiming that it was enough for him to furnish a land connection for it.

FROM TELEGRAPHY TO GARDEN SEEDS.—The publication, at Rochester, N. Y., of Hiram Sibley & Co's "Annual Catalogue" of seeds, etc., for 1883, is announced. Mr. Sibley, it will be remembered, was at one time president of the Western Union Telegraph Company, and is reputed to be one of the wealthiest men in the country.

TELEGRAPHIC COMPETITION IN PITTSFIELD, MASS.—The Mutual Union Telegraph Company has opened an office in Pittsfield, Mass., and has issued a circular announcing that this is the first opposition line to Pittsfield. Prompt service is promised, and it is said the Mutual Union night rates are 20 per cent. less than those of the Western Union Company.

CHESS BY TELEGRAPH.—The chess clubs of Buffalo and Toronto arranged for a series of games to be played by telegraph last Saturday night between 8 P. M. and midnight, over the Western Union wires. At 12:20 A. M. the first game had not been completed. It is to be resumed on Saturday night of this week. Neither club had obtained any advantage when the playing was suspended.

MORE "PLUG" WORK.—An Arkansas correspondent informs us that on one of the railroads in that State the following message was recently given to an operator by a train man, for transmission: "Sand out; send me some immediately." As delivered the message read: "Hand cut; send me home immediately." The consequence was that a special engine was dispatched to convey the supposed mangled employé to his home.

ELECTRICAL TIME SERVICE IN PITTSBURGH.—We learn from the Pittsburgh *Dispatch* that the agents of a time telegraph company are agitating the subject of establishing a system in that city for serving subscribers with accurate time. The clocks, which will be of any desired size and shape, will be rented to householders. Many of the mills, manufactories and other industrial establishments have signified their intention to subscribe.

MILITARY TELEGRAPHISTS' MEETING.—On the evening of Jan. 4 a meeting of old-time telegraphists was held in the Western Union office at Kansas City, Mo., and a branch of the United States Military Telegraph Corps Society was organized. Mr. W. H. Woodring was elected president, Mr. J. D. Cruise, vice president and Mr. D. A. Williams, secretary and treasurer. A pleasant hour was spent in recalling war-time experiences.

A FUNNY "BULL."—Some excitement is said to have been caused in one of the Milwaukee offices recently by the receipt of a message by one of the ladies, addressed to the "Edison Electric Tight Company." Some of the operators argued that the change of title indicated that Mr. Gould had got the Edison Electric Light Company in his grip, while others suggested that it was an appropriate sequel to the celebration of New Year's day.

MORE FAST WORK.—Referring to an item in a former number of this journal, in reference to some fast telegraphic work done in the Pennsylvania oil region, a correspondent writes that one day last week Mr. W. H. Donohoe, of the American Rapid office in Oil City, transmitted and Mr. G. N. Reynolds, of the same company's Petroleum Exchange office in New York, received 163 messages in one hour. The average length of messages between the oil region and New York is said to be greater than that of the messages to Bradford and Pittsburgh, formerly mentioned.

COTTON MEN AND THE SIGNAL SERVICE.—The Cotton Exchange of St. Louis has adopted resolutions requesting the Senators and Representatives from that State to oppose the transfer of the meteorological work of the Signal Service to the Interior Department, and asking them not only to secure, if possible, a more permanent and dependent organization of the signal service as a branch of the War Department, but to urge appropriations of sufficient money to enable the Signal Service to furnish the cotton belt weather reports throughout the entire year instead of eight months only as now.

STOCK QUOTATIONS.—Telegraph, telephone and electric light stocks were quoted as follows on Wednesday, Jan. 17:

	Bid.
Western Union Telegraph	84⅛
Mutual Union Telegraph	24
American Cable	68
Central & South American Telegraph	103
American Bell Telephone	196
American Speaking Telephone	94
Edison Electric Light	300
U. S. Electric Light	125¼
Fuller Electrical	33

T. M. B. A. ANNUAL REPORT.—Pamphlet copies of the annual report of the Telegraphers' Mutual Benefit Association for the year ending Oct. 31, 1882, have been furnished the agents of the association for distribution to members. Besides the proceedings of the annual meeting and the reports of the officers, the pamphlet contains a table of new members admitted to the association from 1877 to 1881 inclusive, and their ages; a table of the ages of the members in 1881; a table showing the probable membership at different ages for each of the years 1882 to 1896 inclusive, at the rate of increase for the five years ending 1881; a tabulated estimate of mortality, etc., for the next fifteen years, on the basis of the "American Experience Table" of mortality; and a synopsis of all the annual reports of the association.

GOVERNOR PATTISON ON TELEGRAPH CONSOLIDATIONS.—Gov. Robert E. Pattison, the newly-elected Governor of Pennsylvania, in his inaugural address, delivered at Harrisburg on Jan. 16, referred as follows to the proceedings instituted against the Western Union Company in that State. "Competing telegraph companies have consolidated in open violation of law, and to the public detriment. Citizens of the Commonwealth have recently invoked the interposition of the State authorities to prevent the continuance of this flagrant wrong. It is to be hoped the proceedings thus inaugurated will result in the vindication of the Constitution, and establish the adequacy of its powers. Corporate lawlessness must be made as amenable to punishment as personal lawlessness."

THE MILWAUKEE FIRE.—The losses of the telegraph companies through the fire in Milwaukee were small. The office of the Mutual Union Company, which was burned out, was the general office in that city, under the charge of Mr. E. R. Chapman. The furniture, fixtures, etc., can be replaced, and the restoration of broken-down poles and wires made for less than $1,000. A new permanent general office, the officers of the company said, was to be opened at once. The loss of the Western Union Company in broken-down wires and poles was trivial, and the interruption to the company's business was brief. Among those who are thought to have perished in the flames was Mr. J. H. Foley, an electrician.

A LAVISH WASTE OF DOTS.—A subscriber writes: "In THE OPERATOR for Dec. 16 I find an interesting conversation between two Pennsylvania Railroad students. The line on which I am at present engaged, 'Out West,' can discount that. Five offices, out of a total of twenty, have managers who cannot, or do not, make the letter P, or the figures 4, 6 and 8 correctly. The chief train dispatcher himself (an excellent gentleman, by the way) is the poorest manipulator on the line. For instance, here is his way of sending a train order: 'No. - — — - ------ ------ To - - ------ - -- — — ------ ------ Hold train No. — ------ ------ ------ etc.' It makes one tired to hear him call 'Mp,' 'Pn,' and 'Pa,' but as long as the supply of dots is unlimited I presume it makes but little difference."

THE WILLIAMS SUITS.—That indefatigable litigant, Mr. W. S. Williams, is still harassing the Western Union Company in this city, and on Monday obtained from Judge Ingraham, in the Superior Court, injunctions restraining the defendants from opening their books or from transferring any of the $15,529,000 stock which was decided by the General Term of the Superior Court to be illegally issued. When the injunctions were argued on Monday afternoon, the Judge modified them so as to restrain the transfer of any of the so-called illegal stock which still remained upon the books of the company in the names of the original holders of that stock. It is claimed by the Western Union Company that it is impossible to distinguish the certificates of the alleged illegal stock from others. At a further hearing on Wednesday, counsel for defendants submitted an order corresponding to the modified direction of the Court on Monday. Plaintiff's counsel objected to this order and handed two other orders to the Court, by the terms of which the Western Union Company would be enjoined from making any transfers of the illegal stock that could be distinguished from the other stock. Judge Ingraham reserved his decision as to which of these several orders he would sign.

TELEGRAPH WIRES AT THE MILWAUKEE FIRE.—In reference to the statements widely published that the efforts of the firemen to save life at the Milwaukee fire were seriously impeded by the telegraph wires in the vicinity of the building, Mr. A. Weller, manager of the Western Union office in that city says: "Careful inquiry of those who witnessed the burning of the Newhall House from the commencement develops the fact that the telegraph wires offered no obstruction to saving life, but on the contrary three or four persons were saved by jumping upon the wires, thereby breaking the force of the fall. It was reported that Allen Johnson and wife could have been saved if the wires had not obstructed the raising of ladders, whereas the highest ladder the Fire Department had was raised inside the wires, but was not long enough to reach the windows, and the inmates had to jump to the sidewalk and were killed. There were two fire-escape ladders fastened to the house, one on Michigan street and one on Broadway, leading from the top of the house to the ground and passing by the hall windows of every story, and yet only three or four lives were saved by them. Every avenue of escape was apparently forgotten in the panic, and some parties jumped through the skylight of an adjoining building and were severely injured, while the fire-escape was within three feet of them. The reports telegraphed everywhere that the telegraph wires were responsible for loss of life originated in the brains of a few excited individuals who knew nothing of the facts."

NEW YORK CITY ITEMS.

Echoes from 195.

Mr. James H. Largay, a well-known operator, who was formerly with the Western Union in this city, died of consumption at Cheyenne, W. T., on Sunday last. He was from Canada, and for several years, before his health began to fail, was regarded as one of the most expert operators of the time.

"Why is it," asks an unfortunate, "why is it that a person cannot leave his desk for lunch, or to get a drink of water, or to go to a window to get a breath of fresh air, or to go for a postage stamp, or to look into the letter box, or to take a walk up and down the soft floor in his india-rubber shoes; and when he does go out for a moment, why is it that he finds everything portable removed from his desk on his return?"

Mr. R. S. Guernsey, who has for several years held a responsible position in the law department of the Western Union Telegraph Company, at 195, has resigned to take charge of the law department of the Mutual Union Telegraph Company, a branch of the telegraph service that seems to be becoming more important than that of the electricians. Mr. Guernsey, we believe, has been for some time past the editor of the *Journal of the Telegraph*.

Mr. W. J. Dealy, manager of the operating department at 195, has given the reporter of a daily paper his views on postal telegraphy, which are, as might be expected, adverse to it. He holds that a system of low, uniform rates, such as that in England, is not feasible in this country, on account of its magnificent distances, and that the public is better served now than it would be under Government control of the telegraphs. Speaking as a practical telegraphist, he says: "A telegraph system could not be carried on for a week without sharp discipline, simply because the work must be done at once, without delay, and the character of the service is reflected in the system under which it is carried on. How could discipline be applied to men appointed for political services or to those who were known as good workers at the primaries? When the Government changed from Republican to Democratic, or *vice versa*, the rank and file would probably remain, because there are after all only about a certain number of operators in the country. But the leaders or superintendents would probably be changed. The idea of appointing a superintendent of telegraph for political influence seems absurd to me, knowing as I do the qualities which are necessary for such a position. Then, too, you must recollect that Government departments necessarily work by rules which are more or less cast iron. But the telegraph, to be effective, must be prepared to meet any sudden emergencies, and it is not seldom that they come. A great fire or accident will tax a telegraph company to the utmost, yet the corporations who own the lines in the United States have always shown themselves prepared to grapple with these when they arise. In the event of the formation of a postal telegraph, Government business would probably have preference. But would the business of every politician also have preference and be called Government? There are many questions about a postal telegraph that ought to be looked into before people rashly conclude that it is all they wish for."

Other City Items.

Mr. A. M. Lewis, of 819 Sixth avenue office, is contemplating a trip to Europe early in the spring.

Mr. Alex. Thomson, late manager of the American District office at 791 Broadway, has accepted a position on the *Mail and Express* newspaper.

Michael Connell, a messenger at 819 Sixth avenue office, was bitten by a dog last week while on his way to deliver a telegram on the Western Boulevard, shortly after midnight.

Mrs. Catherine Garrick, a widow residing on Lexington Avenue, in this city, resisted the attempt of the American Rapid Telegraph Company to plant a pole on the sidewalk in front of her house, and has thereby won the applause of her neighbors in that æsthetic thoroughfare.

PERSONAL.

EMPORIA, KAN.—Mr. H. C. Stough, formerly of Kansas City, is now press report operator at Emporia.

WASHINGTON, D. C.—Among the recent additions to the journalistic ranks in Washington are Messrs. Robert J. Wynne, George Gilliland, Jules Guthridge and R. L. De Akers, ex-Western Union operators, and J. W. Mitchell, Signal Service operator, the two first being on the Cincinnati *Commercial Gazette* and the *Enquirer*, respectively, Mr. Guthridge on the New York *Mail and Express*, and Messrs. De Akers and Mitchell with the United Press Association.

ST. PAUL, MINN.—Mr. William Hendy has been appointed operator at the Capitol during the session. Mr. George Turner, Jr., has resigned his place in the Western Union and accepted a position as press report operator for the *Pioneer Press*, *vice* Mr. Fred Anderson, who has gone back to his first love, the Western Union, where he is to be found on the day staff. Mr. W. J. Widerick has been appointed night chief of the Western Union office, *vice* Mr. Cunningham, transferred to the day staff. Miss Macauley, Mutual Union operator at Stillwater, Minn., paid us a visit on New Year's morning. OBSERVER.

LIVERPOOL, ENGLAND.—Cable operators will be pleased to learn that on Dec. 30 the staff of the Western Union Company's Liverpool office presented their chief, Mr. D. Le Rougetel, with a very handsome cigar and card case, suitably inscribed, as a mark of respect and in token of their appreciation of his ability, courtesy and uniform kindness. The presentation was made by Mr. T. Healey, on behalf of the staff, and Mr. Le Rougetel, who was completely taken by surprise, in an appropriate response thanked the donors for their handsome present and its accompanying expressions of good will.

PITTSTON, PA.—Mr. F. A. Buck, manager of the junction office, has accepted a position as train dispatcher at Sedalia, Mo. Mr. E. G. Miller, assistant agent, takes his place, and Mr. S. Wilcox, of Waverley, takes Mr. Miller's place. Mr. F. S. Spencer, night operator at the junction, has been promoted to the dispatchers' office at Sugar Notch, in the day-time. Mr. N. N. Weiss, from Sugar Notch, takes Mr. Spencer's place. Mr. G. Young, day operator at Coxton yard, has been presented with a son. Mr. W. T. Wynne has the night office, in Mr. Young's place. Mr. F. B. Rhone, day operator at End of Double Track, has returned from the sad duty of burying a brother at Hazleton.

DETROIT.—The coolest operators in the Western Union office on the occasion of the recent fire are said to have been Miss Mollie Corbett and Mr. Philip Eipper. The latter did much to check the excitement and was the last to leave the burning building. The employés in the operating room when the fire was discovered were Mr. M. C. Corbitt, night chief, Messrs. W. C. Black, C. W. Johnson, John Luxon, Charles Thompson, D. E. Lockhart, John Owen, G. E. Root, Frank Carter, W. C. O'Neil, N. S. Snider, E. J. Littlefield, A. Brown, F. J. Dayman, Andrew Beaubien, E. McLaughlin, Colin Fox, James Fox, H. Becker, Fred Schantz, John Powell, D. O'Connor, John Dwyer, Philip Eipper, William Bushey and Miss Mollie Corbitt.

HOUSTON, TEX.—A pleasant time was had at the Western Union telegraph office on New Year's day, when Manager J. W. Stacey and Chief Operator M. W. Connolly were made the recipients of elegant presents from the telegraph operators. Manager Stacey received a large and richly upholstered rocking chair with the letters "O. K., J. W. S." gilded upon the back. These cabalistic characters mean, when placed upon a due bill: "The cashier will pay the face value of this," and are held in great esteem by the boys. Mr. Connolly received a gold-headed cane with his initials and the names of the donors beautifully engraved upon it. The presentation speeches made by Messrs. L. B. Bobo and R. H. Truly were appropriate and not devoid of eloquence. The responses conveyed a hearty appreciation of the gifts and a desire to foster the mutual good feelings now existing.

PHILADELPHIA.—The new Oil Exchange office is to be opened, with ex-Manager H. C. Robinson in charge. Mr. Robinson is widely known and will doubtless make many friends among the oil men. Messrs. Drexel & Co. testified their appreciation of the services of Mr. John Maize by giving him as a Christmas present a sum equal to ten per cent. of his yearly salary. Mr. Joseph Janney, with Messrs. Taylor & Co., brokers, was also remembered by his employers. Mr. Ed. Hall, of the American steamship line was married on Jan. 1 to Miss Ada Townsend, of the city line. Mr. Al. Rudolph, of the city line, entered upon wedded life on the same date. Mr. Pennock, as manager of the American Rapid office gives satisfaction all around, though the operators were sorry to lose Mr. Ahearn. The Erie Railroad has recently advertised in the daily papers for telegraph operators, a most unusual occurrence, and one that seems to indicate a good time coming. The telegraph business is brisk and operators are in demand, notwithstanding that Philadelphia has three "colleges" that profess to make operators. A leading topic among the operators is the Brotherhood. Meetings are largely attended, and great interest is shown. There are few operators in the city who are not members. S. O. UNDER.

CHICAGO.—On Christmas Eve Chief Operator D. S. Anderson, of the Western Union office, was presented with an elegant silver service by the employés of the operating department, as a token of the regard in which he is held by the staff of the office. Mr. Anderson is an old and faithful employé, and is very popular, both with officials and operators. A matter that urgently requires regulation is the ventilation of the operating room. The odors are almost unbearable. When the air gets *too* rank the windows are lowered two or three feet, permitting a current of cold air to rush in over the heads of the operators, and those are lucky who escape severe colds. A very small outlay by the company would secure proper and healthful ventilation. Now that the dull season has set in, it is expected that employés who make errors, great or small, will be subject to an involuntary vacation. It is understood that the management has decided to place the responsibility for all errors made between Chicago and points that work direct with Chicago, upon the Chicago operators, whether they be the senders or receivers of the messages. One man has already suffered the penalty, and no one is now anxious to work the St. Paul wire.

X. Y. Z.

DIED.

BORHEK.—At Atco, N. J., Jan. 15, 1883, Mr. Frank H. Borhek, agent and operator Camden & Atlantic Railroad, aged 29 years; buried at Bethlehem, Pa.

OTIS.—At Pittsfield, Mass., Jan. 16, Mr. Edwin T. Otis, formerly operator at 109 State street, Boston.

WHITNEY.—At Schulenburg, Texas, Jan. 7, 1883, Mr. Joseph B. Whitney, manager Western Union telegraph office, aged about 52 years.

Mr. Whitney was an old-time operator, having entered the service probably twenty-five years ago, and was well-known throughout the country. He was attended in his illness by kind friends, who did their utmost for him. He leaves, as far as known, one brother, Mr. Charles Whitney, who is connected with the New York Life Insurance Company, New York City. DI.

ELECTRICAL PATENTS ISSUED.

Week ending Jan. 9, 1883.

Apparatus for cooling the armatures of dynamo-electric machines; Peter N. Vander Weyde, New York	270,518
Automatic electric railway; Edward N. Dickerson, Jr., and Charles G. Curtis, New York	270,209
Coupling for wires and electric conducters; Henry F. Pumphrey, Fairfield, Iowa	270,478
Device for controlling electrical currents; Charles J. Van Depoele, Chicago, Ill	270,352
Dynamo-electric machine; Joseph Lewis, Chicago, Ill	270,230
Dynamo-electric machine; James McTighe and Thomas J. McTighe, Pittsburgh, Pa	270,325
Electrical car-brake; Albert S. Parsons, Huntington, W. Va	270,248
Electrical control for pendulum clocks; Robert W. Wilson, New Haven, Conn	270,533
Electric arc lamp; Percy Ruskin Allen, Victoria Works, County of Surrey, England	270,361
Electric arc lamp; Samuel Martin and James F. Richards, Pittsburgh, Pa	270,449
Electric cable; William W. Jacques, Boston, Mass	270,438
Electric light; Henry A. Seymour, Washington, D. C.	270,491
Magneto-electric machine; Adam Millar, Glasgow, Scotland	270,457
Portable Voltaic battery; James Mackenzie, County of Middlesex, England	270,551
Railroad signal; Joshua Gray, Medford, Mass	270,305
Telephonic circuit; J. Milton Stearns, Jr., Brooklyn, N. Y	270,500
Telephone exchange system; Charles A. Randall, New York	270,556
Telephone switch; Thomas J. McTighe, Pittsburgh, Pa.	270,326
Telephone switch; Thomas A. Watson, Everett, Mass	270,522

BUSINESS NOTICES.

If you want to become a telegraph operator send 25 cents to C. E. Jones & Bro., Cincinnati, for best illustrated instruction book.

We learn that the Standard Electrical Works, the new Cincinnati company that succeeds to the extensive electrical business of Messrs. Post & Co., is doing a gratifying business, and is supplying a large demand for the Post magneto and electric bells.

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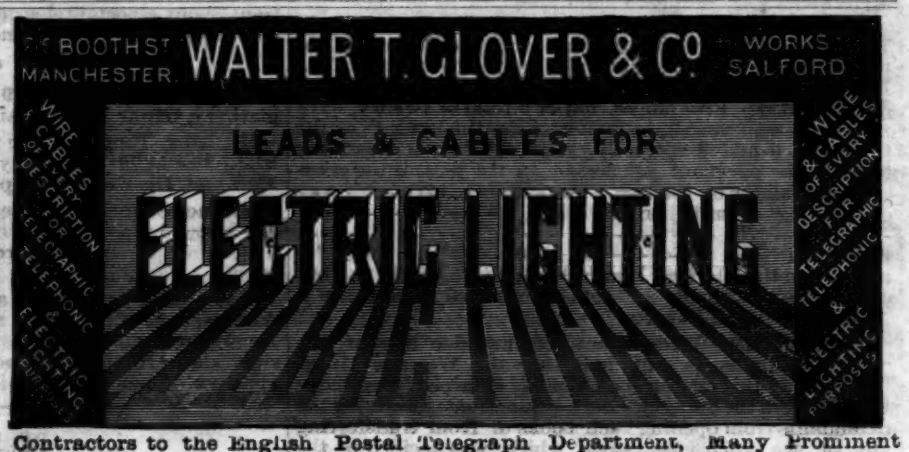
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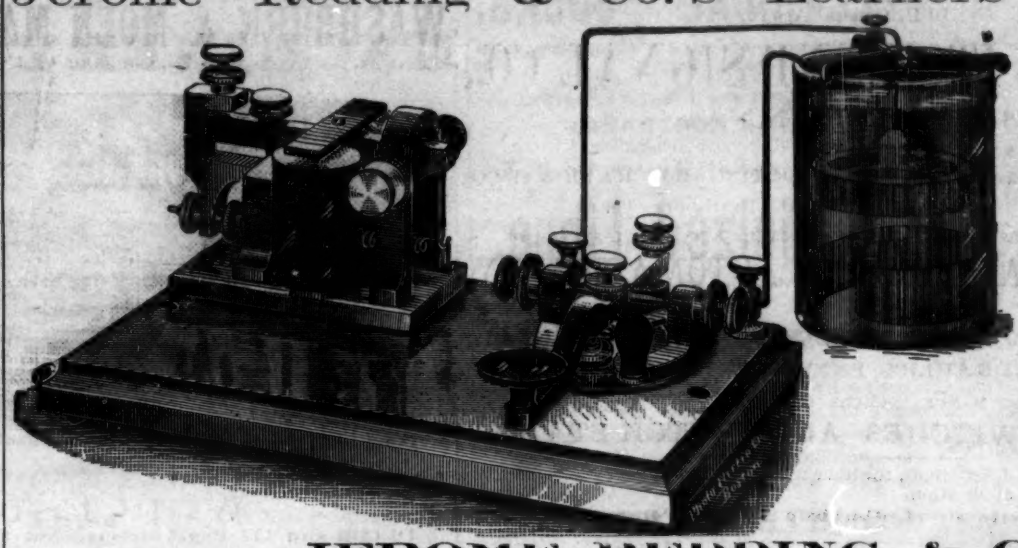

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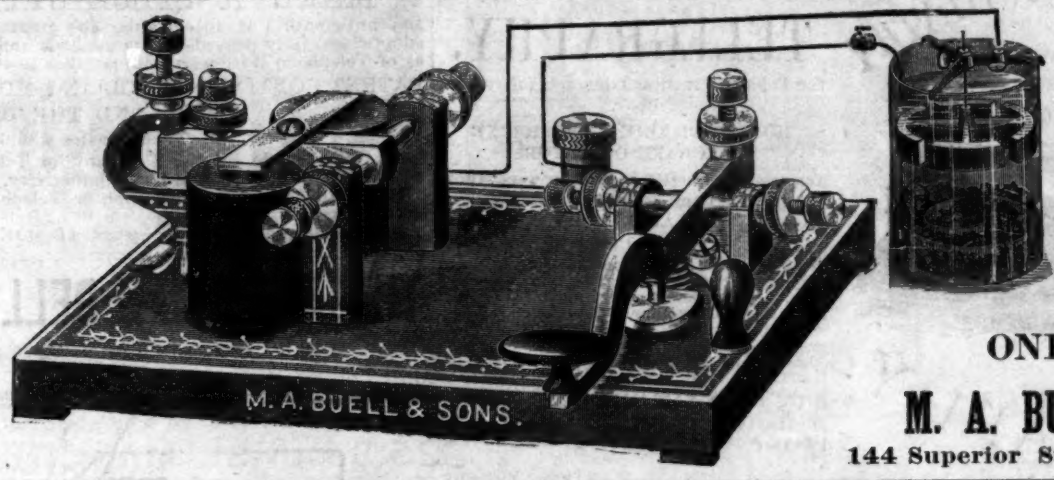

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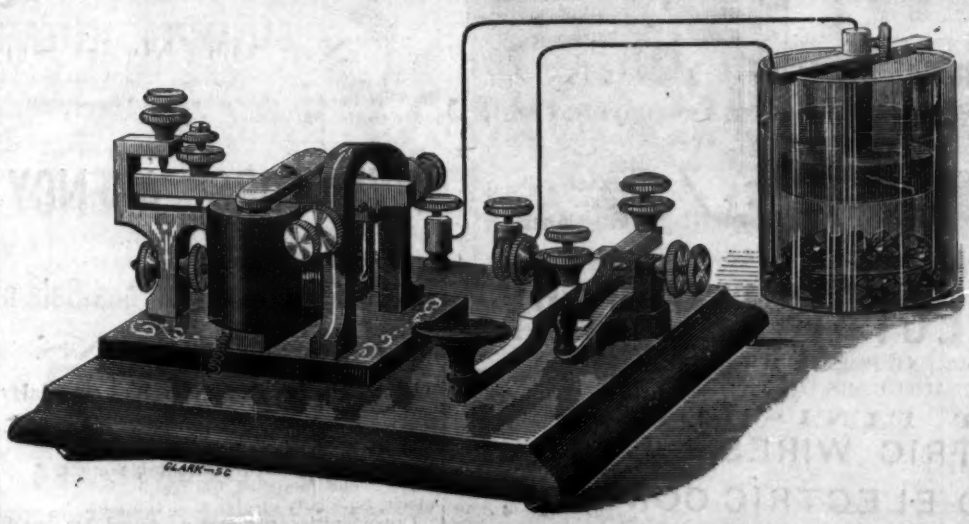

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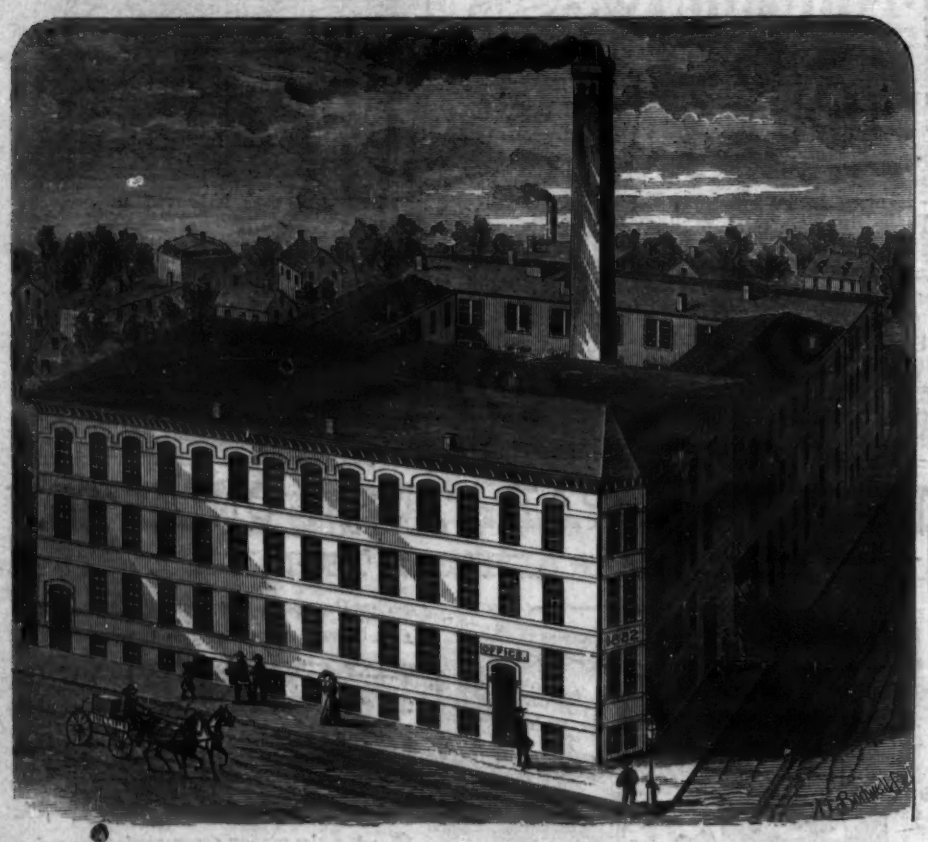

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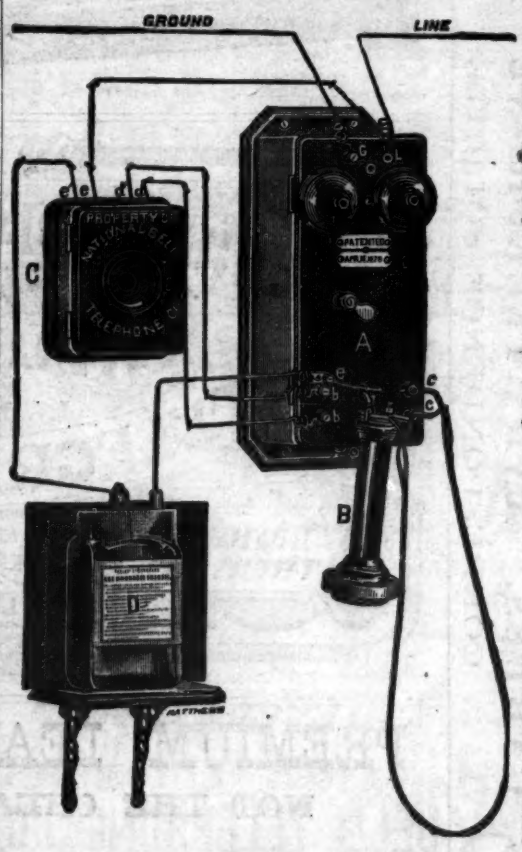

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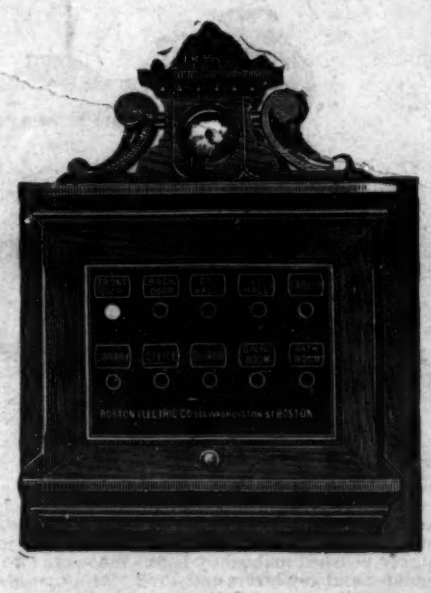

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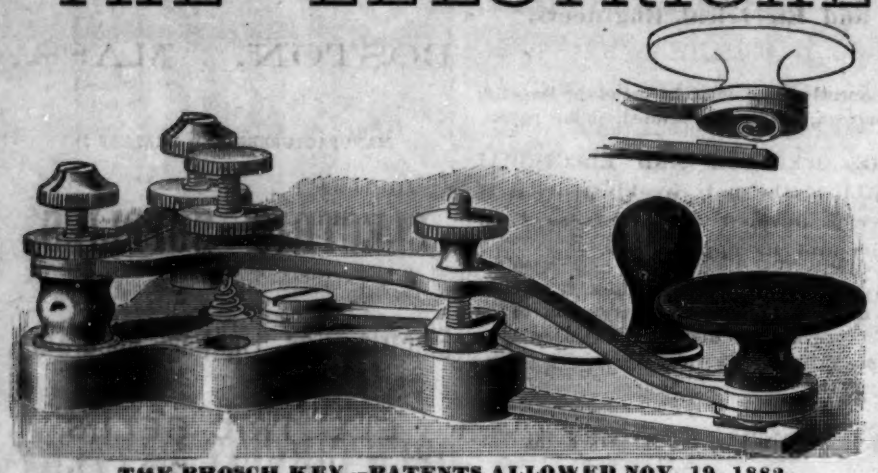

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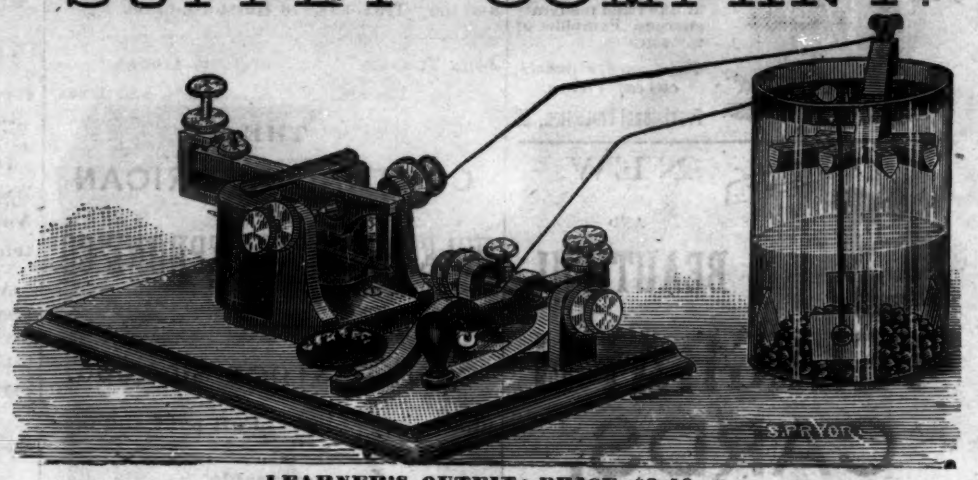

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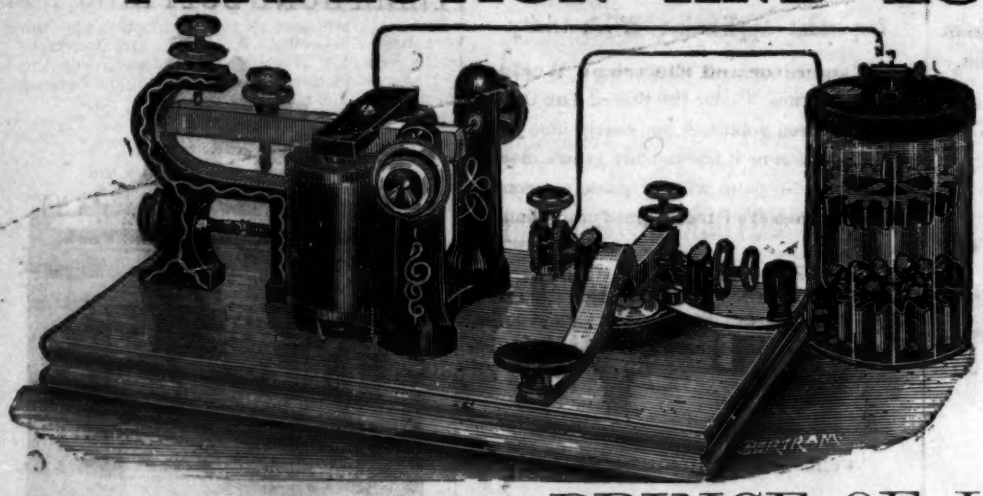

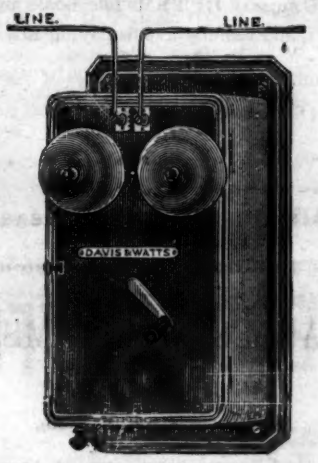

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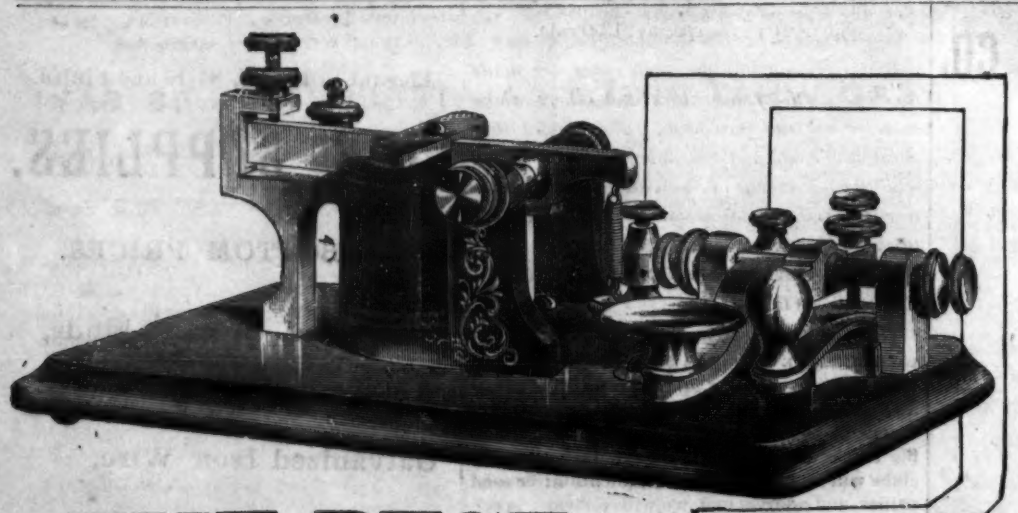

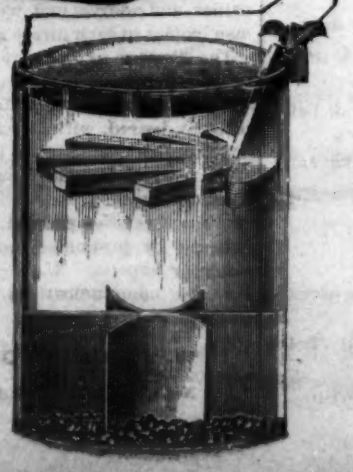

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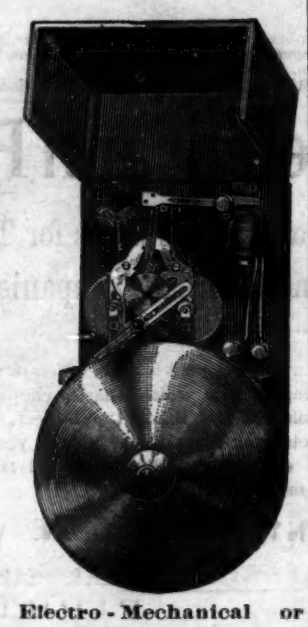

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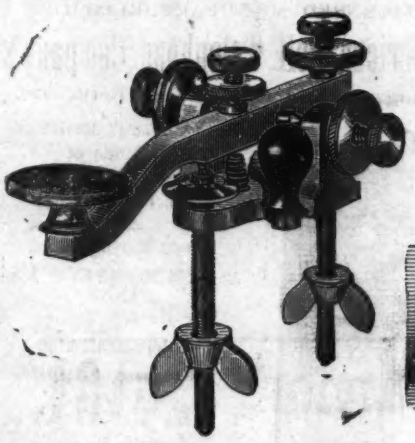

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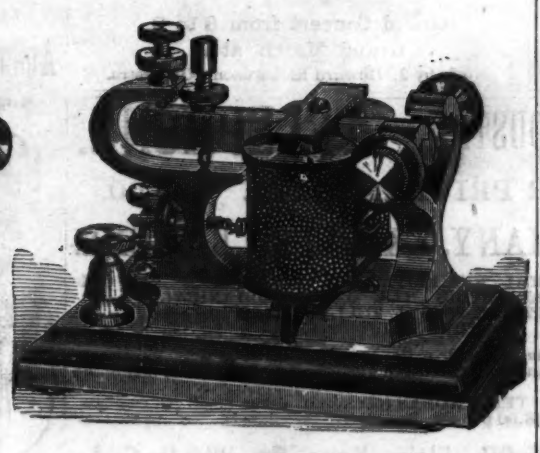

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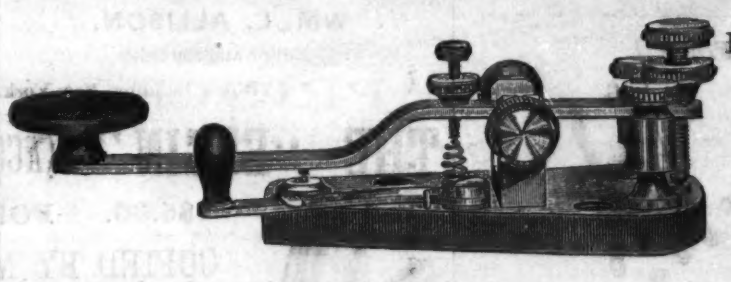

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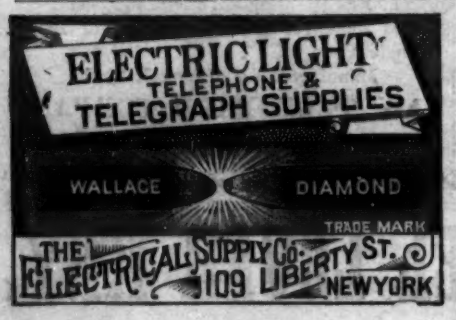

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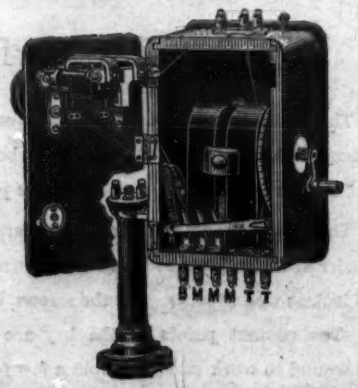

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